THE IRON AGE

New York, January 17, 1924

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Members of the Bridgeport Brass Co. 35-Year Club. Each of the 14 here shown has served the company continuously for 35 years or more, the aggregate of their service being 539 years

Increased Industrial Acquaintanceship

Progress in 1923 in Relations with Employees—Courses in Economics to Explain Business Problems—Overhead Charges a Live Topic

"MOST gratifying progress has been made during the year in sympathetic understanding between the management and its associated workers," said Carl F. Dietz, president Bridgeport Brass Co., Bridgeport, Conn., in the course of an interview with a representative of THE IRON AGE. "This progress is something which it is impossible to state in definite dollar values, but it can be felt distinctly in the shop atmosphere. One big factor has been the realization by the men that this is not a company with absentee proprietorship. The officials in the company, all active in its management, are leading stockholders as well, and among them represent a large share of the capitalization.

"Among the specific points of contact which have been brought into play prominently during the year—most of them for the first time—are the economics courses for foremen and leading shop representatives, carried on last winter and now starting on somewhat advanced lines; the inauguration of the service club with its vacation provisions; the cordial relations instituted last spring with new workers imported from the Maine lumber camps to fill a heavy gap in the supply of labor in Bridgeport."

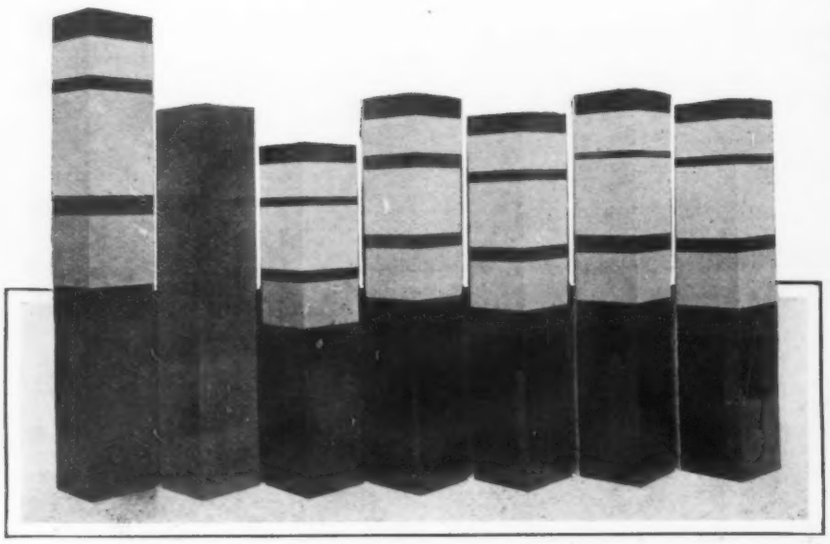
Instruction in Economics

Enlarging upon some of these points, Mr. Dietz referred in some detail to the economics courses. Last winter and spring there were nine meetings, with an average attendance of approximately 150 persons. The program each evening consisted of a buffet lunch served by the company in its own cafeteria, followed by the presentation of a motion picture reel, having some more or less direct relation to the topic of the evening. Then came a paper by one of the executives of the company, followed by an open discussion of the points brought out. The series last spring was devoted to an exposition of the purpose of the company as a member of the American Business Structure. The topics covered included the following:

The Modern Business Objective.
The Financial Contribution Toward this Objective (two papers).
The Production Contribution Toward this Objective.
The Sales Contribution Toward this Objective.
The Research Contribution Toward this Objective.
The General Contribution Toward this Objective.
The Service Contribution Toward this Objective.
Our Business and What it Stands for.

Mr. Dietz gave the first of the papers and the closing one. The others were handled by the executives directly concerned with the specific topic of the evening, including the secretary, the comptroller, the general works manager, the general sales manager, the vice-president and the service manager.

All through the discussion runs the subject of overhead. This was not generally understood; in the first



Group of Blocks Showing Cost Analysis, as Presented at Meetings of the Foremen and Other Leading Workers of the Plant. The blocks are 4 in. square and are colored to give a distinct contrast from each one to the next. In this group of blocks the second from the left (solid blue) represents $1 of sales. Each of the others is a building-up of the cost going into that dollar's worth of sales. The block at extreme left represents a bad year, where the cost exceeded the sale value. The next four blocks to the right of the sales block represent four successive quarters of a moderately good year, while the block at extreme right, the average of the four, represents the entire year. In each case the successive colors represent identically the same thing. The bottom is material, while the other layers are direct and indirect labor, freight, administration expense, overhead, taxes, etc. These elements were explained, unit by unit, and it was shown how the total cost was built up out of a large number of separate items, and how all elements of cost had to be paid before there was any money left over, out of the sales, to provide the wages of capital

place it was thought to represent wholly office salaries, profits, etc. When certain workers were themselves shown to be a part of the overhead, because their work could not be traced directly to carrying out any specific order, they were astonished. Nevertheless the intended discussion made it clear to the group that overhead is not a nebulous, arbitrary charge added for the purpose of making money for somebody "higher up." They began to realize that such items as rent, depreciation, power, light, heat, maintenance, repairs, research, accounting, insurance, selling and administrative expenses are very real items of cost, and that these are among the principal elements which make up the overhead.

The meetings this year are along a somewhat different line. In a certain sense they may be considered as an advanced course. The number of men coming to these meetings is greater than last year, because all service club members and employee stockholders are included as eligible. About 250 men and some women participate regularly in the meetings, filling the meeting room to capacity. The program for this year, given by the president, the secretary, the vice-president, the general works manager, and the assistant to the president covers eight meetings, three of which already have been held, while the five others are scheduled for January and February. The topics of this course are as follows:

What Economics Is About and Why it Should Interest Us.
How it Happens that the Things People Want Are Produced.
What Determines the Prices of Things.
What Banks Are for and How Things Are Paid for.
Transportation: How Things Are Moved from One Place to Another; Risk, Insurance and Speculation.
What the Government Does.
How Things Are Divided; Why Some Have More Than Others.
What Can Be Done to Better Matters.

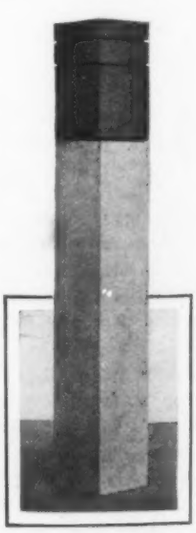
The meetings are held every two weeks. In the intervening weeks other meetings devoted to the subject of metallurgy as related to the products of the company are held. This metallurgical course has attracted about 150 or more each evening, drawing not only from the men in the shop directly concerned with the production of those things which the company sells, but also from the office force handling the "paper" end of the business. At each of these meetings, a moving picture is shown along some cognate line. Any one in the organization is privileged to attend.

"Resulting from these courses," says Mr. Dietz, "we have found a broader understanding of the purpose of the company and the individual contribution by each employee to this common purpose. This is noticed not only in increased interest but in lower scrap production and an increased output per unit of effort and in the number of suggestions offered for improvements in either relations or processes.

"There has been such interest that it has prompted the development of an operation board—an exhibit showing the components of the materials which make up our product and the processes through which those materials go before the product is finished and ready for shipment. This is merely one detail of the methods adopted to interest a man beyond the particular work he is performing.

"Twice during the last year the office workers, in small groups, have been conducted through the plant and guides have explained to them the various processes taking place, the why and wherefore of those processes and the relation of one thing to another and of each to the business as a whole. The second tour came as a result of a well defined interest expressed on the part of the office workers for a better understanding of the business.

"In carrying on the economics courses, we find that the younger members of the organization are more inquisitive than the older, but naturally the older men have a better general knowledge of the business and their comments and questions show a higher degree of appreciation of what the industry stands for. The men have been talking among themselves about the courses. This is particularly true of the foreign born, although naturally little of this is capable of close analysis. We have noted, however, that the concentration of attention is better on the part of the for-

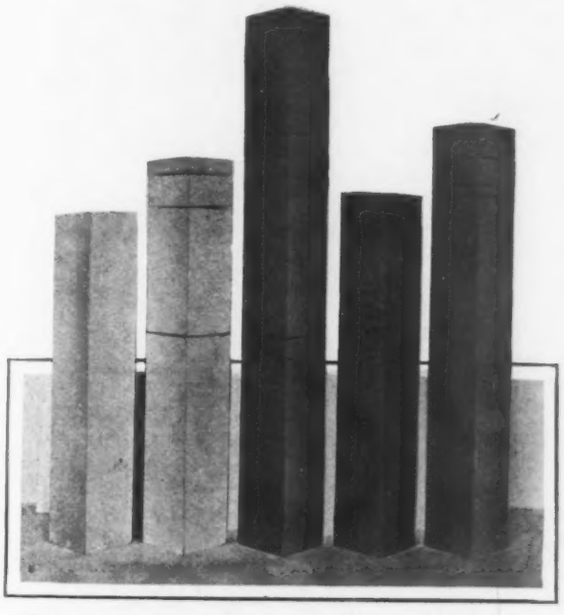


Distribution of Net Value of the Product of the Company. The total height represents the difference between selling price and cost of materials used. The large white section is the share going to the wage earners. The second section is that going to maintenance and development, the third is that going to management, while the top, which is the smallest section of all, is the wages of capital—the amount going to those whose investment has made the company possible

eigners, due in part, possibly, to their greater difficulty in understanding what is being presented, because of their unfamiliarity with the language. This makes a somewhat heavy inertia which has to be overcome.

Service Club

"In connection with the service club, which is restricted to those who have been continuously employed by the company for at least five years, a vacation schedule has been worked out by which those who have been employed five years or more, but less than 10 years, receive one week in the summer with full pay,



Relative Changes in Wages and Living Costs. In each case the unit of 100 is taken as the condition for September, 1914. This is shown by the lower half of the second block, and by the corresponding division in the third or tallest block. The two blocks at the left show the cost of living, the one at extreme left having a height proportional to the cost in October, 1922. The second block shows by its successive upper subdivisions the cost in September, 1918, August, 1919, and January, 1921, this latter being the top. The three blue blocks at the right show the wage scales. The tallest of all represents at its top the condition of August, 1919. The figure for September, 1918, is part way down that block, as shown. The fourth block shows the August, 1921, wage scale, while the right hand block shows August, 1921, with successive increments on top of it representing respectively October, 1922, January, 1923, March, 1923, and, at the top, April, 1923

while those who have been employed 10 years or over receive two weeks. This has done much to ameliorate the general feeling of demarcation between shop and office workers.

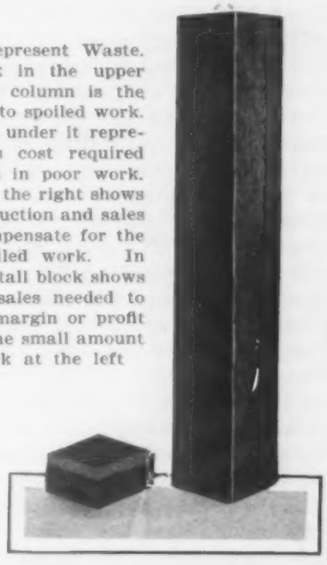
"Each member of the organization, upon reaching 10, 15, 20, 25, 30 and 35 years of continuous employment with the company, receives a personal letter from the president—a service birthday card being sent annually also to those who have been employed 20 years or more. In addition, those who have been with the company for 20 years receive with the 20-year birthday, and each five years thereafter, an appropriate souvenir. This has tended further to correlate the organization. Whenever a death occurs in the organization, a personal letter of condolence is sent to the bereaved family. All of these things show each man that each one contributes his own apportioned work as a part of the general scheme, to enable the company to give better service to the public.

"Right here it must be pointed out, however, that such methods as we have adopted cannot well be successful unless those actively engaged in the management have a sincere desire for close contact and understanding with their fellow-workers in the shops. Any similar programs attempted without the spontaneous desire back of them will fail. The pretense is seldom if ever concealed successfully and its disclosure intensifies any feeling of distrust that may exist.

Labor from the Maine Woods

"Last spring, when business was very active, labor was so scarce in Bridgeport that several of the companies arranged to bring in men from the Maine woods and elsewhere to plug the gap. This company brought in a total of 862, while all the companies together imported perhaps 3000 men. About 100 of those we brought in are still with us and others are placed elsewhere in Bridgeport, although the great majority of the woodsmen went back to the woods at the opening of the logging season. When leaving, however, they evidenced their desire to return next spring.

"These men secured in this way are very desirable workers. They are nearly wholly of old American stock, rugged in physique and characteristics, hard workers, and very alert as a general thing. Our treatment inspired their good-will. Among the other things each man was given a personal letter of greeting upon his association with the company, another cordial letter after he had remained five weeks, while at the end of



These Blocks Represent Waste. The small block in the upper part of the left column is the loss directly due to spoiled work. The larger block under it represents the excess cost required to correct errors in poor work. The tall block at the right shows the required production and sales necessary to compensate for the loss due to spoiled work. In other words, the tall block shows the amount of sales needed to provide enough margin or profit to make up for the small amount of spoiled work at the left

three months service he received a brief letter, together with a check covering his traveling expenses incurred in coming to Bridgeport.

"Accustomed as they were to the open air, large numbers of these men drifted into road work during the summer, or into other outside contracting jobs. To the extent, however, that they filled those openings, and hence protected our regular shop organization from the outside draft, they formed a distinct help. Another incidental help lay in their protecting us to a certain extent from the insistent calls of employment managers in other industries.

Pensions to Superannuated Employees

"We have just begun the application of our pension system. It is based wholly on superannuation, is applicable only to those who have been with us at least 20 years and to those who are more than 60 years old. Nine or ten members of the organization have received pensions. Our scheme has not yet been completely formulated, but so far we have generally arranged to pay an average amount equal to about 40 per cent of the annual earnings during the next 10 years immediately preceding retirement.

"While our employee representation plan, to con-

sider and handle matters between the employees and the management, has been in operation almost six years, there have been developments during the past year along certain lines. In particular, the question of group insurance has received careful attention, including both disability and life insurance. Employees' suggestions for improving sanitation, safety and methods of operation have acquired a prominent place in our program of intraplant contacts. Arrangements for loans to employees have been developed; legal advice and advice as to personal investments have been offered, and are being more and more freely accepted.

Group Insurance Plan

"The corporation and its employees together adopted, some years ago, a group insurance plan under which more than 80 per cent of all the workers, including officers of the company, are now enrolled. This program provides both life and disability indemnities for all who elect to participate.

"Under the insurance plan, disability benefits up to $18 per week, but not exceeding one-half the regular wages, are paid for all cases of sickness and accident not covered under the Connecticut compensation act. In addition to the disability insurance the arrangement provides a life insurance policy of $500 after six months service, increasing to $600 after one year, $700 after two years, $800 after three years, $900 after four years and $1,000 after five years or more of service.

"The disability benefit is payable up to a maximum of 26 weeks during any single illness, not counting the first week. The life insurance is paid, immediately after death, to the beneficiary nominated by the employee. Arrangements are made so that if the man leaves the company's service he can change over his life insurance policy, without medical examination, to any regular plan offered by the insurance company. Monthly dues ranging from 50c. to $1.50, according to salary or wages, are paid by the workers and constitute their contribution to the entire insurance program—the remainder of the cost being borne by the company.

"Thus it is worthy of note that in the insurance, as in all other joint activities conducted by the corporation and its employees, the cost of the activity is equally assessed between the company and the workers. The insurance dues were not originally established on this basis, but they have been adjusted from time to time by mutual agreement between the management and other employees of the company until the financial contribution of the employees to the insurance program as a whole, i.e., combined disability and life insurance, is practically equal to the financial contribution of the corporation for the same project. This joint financial responsibility logically implies the joint authority exercised in the administration of the activity by the delegated representatives of the two parties in interest.

"Suggestions from employees are handled through two committees connected with the employee representation scheme, one committee being located in each of the two main plants. These committees are empowered to award prizes ranging from $5 to $25 for each useful suggestion. In addition to this, the committees report to the management on particularly meritorious suggestions and recommend awards higher than those which they can make direct. In one such case, it was recommended that an exceptionally good suggestion receive an acknowledgement of $250, which the company paid. The flow of these suggestions naturally has been stimulated by the courses in economics.

"Loans to employees are handled through the local Morris Plan Bank. The company has purchased securities of this bank, which it uses as collateral for these loans. The question of each loan is considered carefully from every angle and, being handled as they are, relieves many perfectly reliable members of the organization from the loan sharks, pawn brokers and others who might otherwise prey upon them.

Consultation on Financial Matters

"We encourage our men to consult us with regard to their personal investments. In this way we have been able to steer them clear of much unwise investment or speculation and to guide them along conservative lines in which safety of their savings is the primary consideration. Some of the stock of the company which came into our hands some time ago has been sold to the employees on the partial payment plan at exactly the price which we paid for it. The basis has been 5 per cent cash at time of purchase and $4 per share per month until the purchase is paid for. In this way the company has arranged to carry the loan in decreasing amounts over a period of about three years. The dividends on the stock have been paid in cash. Interest on the unpaid part of the loan, however, has been charged quarterly to the subscribers—not at the rate at which they can borrow but at the commercial rate for prime paper in the New York market. Hence, most of these loans have been carried at 4 to 4½ per cent, the highest figure at any time having been 4¾ per cent.

"Each man owning stock in the company, even if he has made only the first payment upon it, is urged to be present at the annual meeting and at any other meetings of stockholders which may be called, so that he can see how the meetings are conducted, what is done, and how his interests, as merged with those of the company as a whole, are being cared for.

"I cannot speak too highly of the accumulative results all of these methods or points of contact with the men have brought about. They have improved the tone of the whole organization from top to bottom and have further consolidated our mutual interests. Each of the items mentioned has had its share and all together have contributed much toward the present cordial cooperation observable in all departments."

Malleable Castings Production

WASHINGTON, Jan. 10.—The Department of Commerce announces statistics on the production of malleable castings manufactured for sale by months. The returns include only those castings manufactured for sale as such and do not include those used in the plant or finished and sold as other products.

Figures are also shown comparatively for June, July, August, September, October and November, covering the operations of 107 identical plants for which reports were received each month.

Month	Plants Reporting (Number)	Total Production (Tons)	Total Shipments (Tons)	Orders Booked (Tons)	Monthly Capacity of Plants (Tons)	Per Cent of Total Capacity Operated
May	99	64,726	62,806	52,898	91,174	71.0
June	109	65,168	64,608	42,067	96,240	67.7
July	112	57,881	60,102	41,723	98,241	58.9
August ..	116	68,069	65,405	39,830	103,068	66.0
September	116	60,930	59,396	38,636	101,750	59.9
October ..	116	62,238	59,129	48,621	103,837	59.9
November	125	52,727	49,426	37,231	107,350	49.1

Comparative Summary for 107 *Identical Plants*

Month	Plants Reporting (Number)	Total Production (Tons)	Total Shipments (Tons)	Orders Booked (Tons)	Monthly Capacity of Plants (Tons)	Per Cent of Total Capacity Operated
June	107	63,298	62,888	39,814	94,840	66.7
July	107	54,433	55,922	39,131	94,826	57.4
August ..	107	63,038	60,207	36,753	94,858	66.5
September	107	56,024	54,378	35,452	93,565	59.9
October ..	107	56,798	54,221	43,978	95,652	59.4
November	107	47,112	44,215	34,817	95,801	49.2

Management in the Public Interest

What the Public Is Entitled to and Should Enforce in Industry for Its Own Benefit

BY ROBERT T. KENT*

THE interest of the public in good management lies in the possibility of (a) lower prices, (b) better quality in the goods it buys and (c) in the assurance of a stable supply.

(a) Lower prices depend on low labor and material costs, and efficient operation of plant in order to obtain a maximum of product with a minimum of equipment—i. e., of capital investment. Low labor costs and efficient operation of plant are direct results of good management in the plant itself. Low material cost is the result of good management in those industries from which the plant draws its supplies. The conclusion follows that efficient management throughout all industries will bring lower prices all along the line.

(b) Better quality follows from the superior workmanship that results from good management, and from the inspection that is a necessary part of it. Good management places workmen in the jobs for which they are best fitted, and maintains the equipment in the condition which is the prerequisite of economical production of high-quality goods.

(c) A stable supply of finished goods is assured when labor troubles are eliminated or minimized in an industry; when the raw material can be obtained in ample quantities and at the proper time, and when the capital for carrying on the industry is readily available to finance extensions or to carry over dull periods. When the business is of a so-called seasonal character, the analysis of the problems which naturally follows progressive management frequently will find means of transferring the peak loads of the industry to the less active periods, and thus tend to stabilize production.

The Labor Factor

Observe that in all of the foregoing, labor is a prominent factor. Wages represent a large portion of the cost of the goods bought by the public. High wages do not mean high costs, unless coupled with low productivity. Low costs are possible with the highest wages, providing that good management insures high productivity. It is true that the present tendency in many trades is toward higher and higher wages, with diminishing productivity, and this tendency must be arrested before there is real stability in industry. Some way must be found to get the elementary facts of political economy into the heads of the workmen.

The desire of labor for the greatest possible return for its efforts is natural. It is also natural that it follows the line of least resistance in obtaining increased returns. If labor can force employers to pay it more money for the same service, and the employers can pass this increased cost on to the public in the form of higher prices, this is the line that will be followed. The public then pays for its inability to compel the industry to absorb the increase by better management. If, on the other hand, labor can enforce its demands, but the employer, through force of circumstances, cannot pass on the increased cost, he must perforce absorb it by better management within the industry, which will lower his overhead and increase the productivity of his equipment. The third case is where labor is not powerful enough to force higher wages. Then its only remedy is to increase its own efficiency and thereby bring about the higher return it desires. The progressive employer can do much to assist labor in this respect, and in the last analysis the burden is on him. Without his cooperation labor can do little by itself.

The Burden Passed to the Public

A case in point is the recent coal strike. Labor in the anthracite field has been able to force continually higher and higher wages, until prices for coal are now triple what they were twenty years ago. The successive wage increases have been passed on to a public unable or unwilling to protect itself. There has been no incentive for the employers to so manage their business that the standard of labor productivity would reach a point where the cost of production would be lowered to such an extent that labor demands would be satisfied without any increase of price to the public. In the recent settlement it was proposed that the increased price of coal at the mines should be absorbed in part by the coal companies and in part by a reduction in transportation and distribution costs. The public was skeptical about the last two items. Nevertheless, in one large city, at least, it was announced by the distributers that there would be no increase in price, the increased cost being absorbed by more efficient delivery methods, and a reduction in the overhead charges on distribution. The moral is plain. The price of anthracite is approaching a point where the public will find it more economical to use substitutes, and the industry, facing the loss of its market, is compelled to look to better management to reduce its costs. The public, then, is entitled to ask why, if better management now will prevent increase in prices, it should not be still further applied to reduce them.

What is true of the coal industry is true of all others. So long as increased costs can be passed on to the public in the shape of higher prices, there is no incentive to better management, except increased profits. And of these increased profits, labor will surely and rightly demand its share. At present, unless restrained by competition or by a saturation point in prices that will destroy the market, there seems to be no limit to what the public can be compelled to pay. It is obvious that costs can be lowered by better management, and it is equally obvious that the public must find some way in which to compel its basic industries, at least, to be managed in the best possible manner to insure these lower costs.

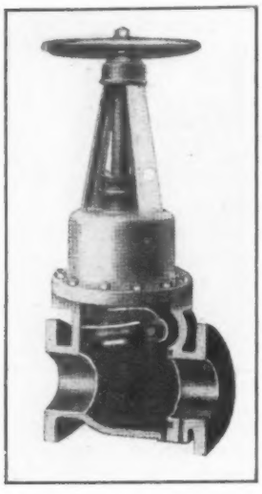
How to do this is a most baffling problem. Price fixing by law is futile. Public ownership, even were it efficient, the country is hardly ready for. Government regulation frequently has the effect of throttling an industry, as witnessed by the plight of most of

(*Continued on page 264*)

*Consulting management engineer, New York, and editor-in-chief of Kent's Mechanical Engineer's Handbook.

Full Opening Feature of New Valve

The Borsig straightway steam and water valve illustrated, having full aperture opening without obstruction or change of direction as a feature, and provided with means for regrinding the seat without dismantling from the pipe line, has been placed on the American market by the Techno-Service Corporation, New York. It is for steam pressures up to 300 lb. per sq. in., superheat up to 400 deg. C. (750 deg. Fahr.). The body is of cast steel and the valve seat rings of nickel-bronze alloy.



Straightway Valve With Full Opening, Without Obstruction or Change of Direction

The loss of pressure where an 8-in. valve of this type is used is claimed to be equivalent to not more than 18 running feet of pipe line. The drop in pressure with steam passing at a velocity of 230 ft. per sec. is said to be only 1.1 lb. per sq. in.

In the valve body the seat is arranged at right angles to the axis of the pipe line. The valve door swings on a lever held by a pin and adjustment is provided by means of a stud which engages in a screwed boss. A spring is provided to prevent chatter of the valve door on the seat. The stud used for adjustment exerts its pressure in the center of the valve door and, with the aid of its cone form, this arrangement is said to give very close alinement.

The valve is operated by the main stem through a toggle lever attached to the slide. When opening the valve the disk disappears in the bonnet, leaving a straight unobstructed passage for the steam. For regrinding the valve seat, the bonnet is removed and the disk revolved gradually against the valve seat. The valve is available in sizes from 4 to 16 in.

Hardness Changes Accompanying the Severe Cold Working of Metals

For some little time past the Bureau of Standards has been investigating the changes in hardness which accompany the severe cold working of metals. At the recent meeting of the advisory committee on non-ferrous metals several suggestions were made for further work on this problem and during the past month several of these suggestions have been followed out.

Results obtained indicate that the hardness changes of metals after severe cold working, as measured on the surface of cold rolled strips, are of the same nature as the changes within the strips, that is, as measured on sections through the strips perpendicular to the surface. There do not appear to be any pronounced directional properties in the hardness of severely cold rolled metals. The effect of the temperature of rolling on zinc and copper also was investigated.

When the rolling process was carried out at a rather low temperature, produced by cooling both the rolls and the specimen with ice water, it was found that the hardening of the metal, particularly of the zinc, during the initial stages of deformation, was greatly increased. The tendency of the metal to crack and split during the initial stages of deformation was very marked.

After the metal under investigation had been reduced into a strip, however, softening occurred as before, and with further deformation the low temperature appeared to have but little if any influence upon the hardness.

Truing Device for Commutators

For keeping commutating and slip ring surfaces on rotating electric equipment in good order the Jordon Bros., Inc., 74 Beekman Street, New York, is offering an abrasive truing device in three sizes. They are said to permit of truing commutators and slip rings without removing the armature or rotating field from the machine, the armature rotating in its own bearings at operating speed and under its own power.

The device is provided with suitable clamping attachment to fasten it to the rocker arm, bearing or frame of the machine. Steadying rods clamped to the machine frame and supporting the free end of the main shaft of the device provide additional rigidity. The main shaft of the machine is placed parallel to the armature shaft of the generator or motor. This shaft supports the movable grinding wheel in ball bearings.

The type G and type E devices are for smaller machines and the type J for larger. In the units for the smaller machines the shaft is set in an eccentric barrel and the depth of cut varied by manipulating a handle, the slide feed along the commutator being accomplished by pushing the handwheel in the direction desired. The type J device has the grinding wheel mounted on brackets. These are moved for depth of cut by a crank operating a worm and worm wheel. A screw feed with handwheel is provided for the horizontal feed along the commutator. A grooved pulley on the grinding wheel shaft is driven by belt from a small motor.

Caustic Embrittlement of Boiler Steels

During the past month the Bureau of Standards made a microscopic examination of a boiler plate which had developed cracks in service. Such steel is generally referred to as caustic embrittled steel. It has usually been assumed that embrittlement occurs as a result of the absorption of nascent hydrogen which has its origin in the interaction of iron and caustic alkali. The alkali results from the hydrolysis of certain "boiler additions" made to the feed water and this alkali concentrates in crevices around rivets and similar places. Cracks appear in the plate only as a result of a combination of two conditions; stress within the metal and chemical attack by the alkali. The examinations made confirm those of other investigators in showing that caustic embrittlement is an intercrystalline phenomenon, that is, the cracks have an intercrystalline course and are not directed by inclusions or other visible impurities within the steel. The examination also confirms the assumption usually made that the production of hydrogen is accompanied by oxidation of the iron. In the specimens examined all the cracks were found to be filled completely with oxide of iron, even to the innermost ends of the finest microscopic cracks, where the chance of oxidation from without would be entirely negligible.

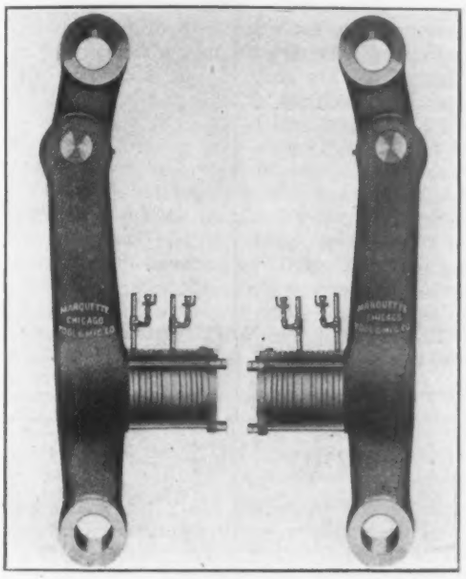
Patent for Improved Bessemer Converter and Linings

Richard S. McCaffrey, professor of mining and metallurgy, University of Wisconsin, Madison, received notice Jan. 11 that letters patent have been issued to him on a new process for bessemerizing iron. Application for the patent was made about two years ago. In a statement Professor McCaffrey said: "The patent is for improved converters and linings for converters in the production of Bessemer steel. There are certain furnaces employing a pig iron high in chromium and using a converter lining of siliceous material with the result that the lining lasts only for 60 to 70 blows. The patent is for a chromite lining in conditions like this, a material which should have a life of from 800 to 1000 blows. With this chromite converter lining it is possible to eliminate phosphorus from the steel and make a higher quality product than is possible with the use of siliceous lining and chrome bearing pig iron."

Pneumatic Toggle Links

Pneumatic toggle links for use on toggle presses, permitting of setting the blank holder to a required pressure rather than a constant distance, are being marketed by the Marquette Tool & Mfg. Co., Chicago.

Several advantages are claimed for the pneumatic toggle links, which are illustrated herewith. The blank holder will adjust itself automatically to variations in the thickness of the sheets, and it is said that sheets less uniform in thickness at less cost may be used with as good result. Compensation for thickening of the sheets which might take place during the drawing operation is provided, breakage from this cause being eliminated. The amount of pressure on the blank



Pneumatic Toggle Links Which Permit of Setting Blankholder to a Required Pressure Rather Than Constant Distance

may be changed during the stroke of the press. Breaking of presses because of improper adjustment of the blank holder, feeding blanks that are too thick or feeding more than one blank at a time, is said to be obviated and by adjusting itself automatically to sheets of thinner gage, wrinkled stampings are eliminated. Provision is made for exertion of different pressures at different corners of the blank holder, on stampings where that feature is desired. Gages showing accurately the pressure attained may be provided.

In cases where more pressure is required on one corner of the blank holder than on the other, it may be obtained automatically by regulating the air pressure in the cylinder or cylinders at the points where the most pressure is required, by means of the company's automatic pressure control device. Where it is desired to hold the blank very tight for a stretching operation and release for a subsequent redraw, it is unnecessary to reset the blank holder. Both the stretching and redrawing is accomplished in one operation by changing the pressure on the blank by means of the pneumatic toggle links described in connection with the company's automatic pressure control.

Installation of the pneumatic toggle links does not require changing of any of the press parts. The four links provided with the press are removed and replaced by the pneumatic links.

Addition to the by-product coke plant of the Republic Iron & Steel Co., Youngstown, Ohio, consisting of 61 Koppers-Becker ovens, has been completed and placed in operation. These ovens are capable or carbonizing 24 tons of coal per day each with a resultant yield of 18 tons of coke; this means that the annual coke production of the company's plant has been increased 400,770 tons. The plant now comprises 204 ovens, with a yearly capacity of 1,194,000 tons.

New Hendey Milling Machine

A 2G universal milling machine with constant-speed drive and incorporating improved features, including ball-bearing mounting of shafts and automatic lubrication, has been placed on the market by the Hendey Machine Co., Torrington, Conn.

The machine has 18 progressive spindle speeds, ranging from 15 to 355 r.p.m., obtained through combinations of sliding gears, changes being made by means of two levers mounted together with the index plate on a box on the side of the column. The final drive for all speeds is through the spindle gear which is keyed fast to the spindle. Driving gears are of alloy steel, hardened and heat treated, and the driving shafts and drive pulley are mounted on ball bearings. The spindle reverse is obtained by gearing. It is operated by a lever on the right-hand side of the machine and does not change the direction of the feeds. Convenient starting and stopping of the machine is provided for, vertical levers on each side of the machine operating the friction clutch, engaging or disengaging the driving pulley. The main spindle has taper journals which run in annular bearings.

A reservoir cast in the mid section of the column contains the oil for lubricating the spindle speed gearing and all bearings. Oil is pumped to a trough located above the spindle gear, from which it is distributed through a series of pipes to all bearings and to all gearing in the speed-change mechanism. Overflow holes leading from the spindle bearing reservoir are intended to keep the oil supply there at a constant level. Spindle bearings are lubricated by ring oilers, which revolve with the spindle and circulate oil from reservoirs beneath the bearings. Cutting lubricant is pumped from a reservoir in the base. Both the oil and lubricant pumps are submerged and do not require priming.

The feed change gearing with its control is carried in a single box casting, applied as a unit to the side of the column. Sixteen changes of feed ranging from 0.4 to 20 in. per min. are provided, being obtained through sliding clutches operated by two levers. All clutches and gears are of hardened alloy steel, and shafts are mounted on ball bearings. The feed reverse mechanism is inclosed in a box attached to the right-hand side of the knee, serving also as a reservoir, permitting the mechanism to run in an oil bath.

The vertical and cross feed handwhee'ls are provided with concealed clutches in the hubs, which permit the wheels to run free on the shaft when not employed. The overarm, of key type, 4½ m. in diameter, is provided with a locating stop which registers the pendant with center line of the spindle. An adjustable belt guard extending above the column is provided.

The table has a working surface of 12 x 48 in. and is fitted to the saddle with a taper gib for taking up wear. It has bearing on shoulders of the saddle, supporting it so that work may be machined to the edge without rocking. The quick-return crank handle has long leverage, and clutch-engagement which disconnects when not in use. The machine may be equipped with power quick traverse in either direction for the table. The longitudinal feed is 28 in., the transverse travel 10 in. and the vertical travel below center 18 in., all automatic.

The spindle has a through hole 1 m. in diameter, and a B & S No. 11 hole in the end. The weight of the machine is approximately 4500 lb. net, and the floor space required 99 x 112 in.

The blast furnace of the La Follette Coal & Iron Co. which has been in blast since June, 1922, was blown out on Dec. 29, 1923, for temporary repairs. Within the past few months the furnace developed a growing top and it was thought wise to close down before the condition became serious. Apparently the difficulty was due to carbon deposition but the exact nature of the trouble cannot be determined until the upper tiers of brickwork are removed. Repairs will be rushed with all possible speed and it is expected the stack will blow in again by Feb. 1.

How to Keep Malleable Cast Iron from Becoming Brittle

Deterioration in the quality of malleable cast iron is found to result when the iron is heated to within a critical range of between 500 and 900 deg. Fahr., and is then quenched, or cooled rapidly to lower temperatures. This deterioration is marked by a lessened ability to resist shock and is encountered, for example, in the hot galvanized process. Its fundamental cause is not yet known.

An investigation of this phenomenon made at the Bureau of Standards showed a considerable variation in magnitude as between different samples of malleable iron. The impact method of testing was used, and was found to offer a very convenient means of measuring the degree of deterioration. The tests also showed that there is a fairly definite range of quenching temperatures to which the effect is limited. Aging after heat treatment within this range did not affect the results. The rate of cooling was found to have an important influence, the degree of embrittlement being materially lessened if the iron was cooled slowly instead of being quenched.

If, on the other hand, the iron was heated to a temperature some 200 deg. above the critical range and quenched from that temperature it was found to be materially more resistant to shock, and it was also rendered immune to embrittlement as a result of subsequent reheating to within the critical range.

These tests are described and the results given in Technologic Paper No. 245 of the Bureau of Standards entitled "Embrittlement of Malleable Cast Iron Resulting from Heat Treatment" and copies may be obtained from the superintendent of documents, Government Printing Office, Washington, D. C., at 5 cents each.

Plans of New Concern to Succeed Kelly and Belfont Companies

CINCINNATI, Jan. 14.—Further details of the merger of the Kelly Nail & Iron Co. and the Belfont Iron Works Co., both of Ironton, Ohio, which will be ratified by the stockholders of the Kelly company on Jan. 16, and by the stockholders of the Belfont company on Jan. 30, indicate that it is the intention of the new company to be organized to move the mills of the Kelly company to the Belfont wire and nail mills, which will probably be enlarged to take care of the increased number of wire and nail machines to be installed. The site of the present Kelly plant will be used for the new steel plant which it is planned to build. This will give the merged companies free access to hot metal from both Belfont and Sarah furnaces. It is understood that the merged companies have already taken options on mill machinery of the Carbon Steel Co. and that contracts will shortly be let for building a large open-hearth plant. In addition to the new plant, the merger will be in control of the Ashland Steel Co., as the Kelly Nail & Iron Co. and the Belfont Iron Works Co. each owns one-third interest in this company.

Carnegie Steel Co. Safety Trophy 1924

CARRYING out its plan of two preceding years in placing its safety work on a competitive basis among its 18 plants, the Carnegie Steel Co., Pittsburgh, has had designed and cast another bronze safety trophy for the year 1924. As in the competition last year, the trophy is to be awarded from month to month, and at the end of the year in perpetuum. The monthly award is based on the greatest percentage of decrease in lost time accidents at any plant as compared with the same month for the preceding five years, and the perpetuum award is based on the greatest decrease throughout the 12 months compared with the preceding five years.

This basis of award has been found to be more equitable and satisfactory than any other plan, and places all plants, large or small, and with varying numbers of men, on a just basis of competition.

The trophy for 1924 was designed by Giuseppe Moretti, a sculptor, who resides in Pittsburgh, and who designed the two preceding trophies. This trophy stands 33 in. high to the top of the rider's banner staff. It is 10 in. wide at the base and on the reverse side bears the words in relief:

CARNEGIE STEEL CO.

SAFETY TROPHY, 1924

In his story of the composition Mr. Moretti declares that machinery is an unwieldy, destructive power subject to the control of man. This power is a force that exists to a degree in all tools and equipment, whether the simplest implements of primitive labor, the horses and cattle of the ranch, the elaborate equipment of the scientific laboratory, or the vast, awe-inspiring machinery of the modern industrial world.

Safety First is an intellectual power introduced into the world since machinery began to be employed to increase production. This intellectual power has always existed in the form of instinctive self-preservation. Under former simple conditions it could be trusted vaguely as an instinct. With the late rapid development of machinery, man becomes confused before vast new forces of inanimate power and intricate dangers of science. These forces demand quicker reactions and firmer precautions against danger than man's ancestors required. To answer this demand the latent, almost unused, instinct of man called self-preservation has been organized into an invincible force under the slogan name, Safety First.

Safety First, as a recognized intellectual being, is therefore young. His strength, though absolutely without limit in its possibilities, is still in its youth. Human Labor, the other force, is an older, ever existing power in its full strength, but very young.

With rare truth and clearness of vision, and great beauty of design, Mr. Moretti has developed these facts in his 1924 Safety Trophy for the Carnegie Steel Co.

The 1923 Perkin Medal Presented to an American Metallurgist

THE public presentation of the Perkin Medal for 1923 was the occasion of a notable tribute to a leading metallurgist and chemist on Friday evening, Jan. 11, at the Chemists' Club, New York. The Perkin Medal is awarded annually to a chemist residing in the United States for the most valuable achievement in applied chemistry. The award is made by a committee appointed each year by the American Section of the Society of Chemical Industry (British) and announcement was made last November that Frederick M. Becket, chief metallurgist, Electrometallurgical Co., New York, had been selected.

F. M. BECKET

After an informal dinner in Mr. Becket's honor, members of the Society of Chemical Industry, the American Chemical Society, the American Electrochemical Society and others assembled in Rumford Hall for the public exercises. The joint session was presided over by Ralph H. McKee, chairman of the American Section of the Society of Chemical Industry, who gave a brief history of the Perkin Medal. About 17 years ago Sir William Perkin, the discoverer of mauve in 1856, after his migration from England to America, gave a sum of money to the American Section of the Society of Chemical Industry to found a medal for work in applied chemistry. Mr. Perkin was the first to receive the medal at the hands of American chemists and it was presented to him by Dr. W. H. Nichols, who stated at the time that "the medal was to be given thereafter annually to the American chemist who had most distinguished himself by his services in applied chemistry." Mr. Becket is the seventeenth recipient of this medal and by a happy coincidence the public presentation came upon his forty-ninth birthday anniversary.

The occasion being wholly a tribute to the recipient, the first speaker was James H. Crichett, a close associate of Mr. Becket for the past 10 years, who spoke in appreciation of his chief and gave some intimate reminiscences. Among Mr. Becket's traits, he emphasized thoroughness and high standards, energy and constructive imagination, combined with an unusual gift of memory.

Mr. Becket's Inventions

Clinton P. Townsend, for many years patent attorney for Mr. Becket, recounted some of the steps which have led up to the granting of some 62 patents covering many new processes having to do with the ferroalloy and alloy industry. Mr. Townsend took for his text the patents of Mr. Becket because in his estimation it is largely in this way that his great contributions to science and industry have been made. Of this phase of Mr. Becket's work he said that "his responsibilities in these years have been of such a nature as to prevent him from following the custom of first publishing his results through the scientific journals or technical press. On the other hand he has consistently and with painstaking care seen to it that each patent specification was in reality a technical treatise, often brief but always conforming in subject matter to the usual highest professional and technical standards." Referring to Mr. Becket's early work, he spoke of the Niagara Research Laboratory, formed early in the nineteen hundreds by Mr. Becket, L. E. Saunders and R. A. Witherspoon, both of the latter being present.

Dr. C. H. Herty presented a resolution from the Montreal Section of the Society of Chemical Industry in which the satisfaction and pride of the section was recorded in the fact that Mr. Becket, a native of Montreal, a graduate of Montreal high school and McGill University, had been selected to receive the 1923 Perkin Medal.

Dr. Herty was followed by Prof. C. F. Chandler, founder of the School of Mines, Columbia University, and senior past president of the Society of Chemical Industry, who presented the medal to Mr. Becket. Dr. Chandler spoke of him as one whose work in applied chemistry was most original and valuable. Among the noteworthy achievements of Mr. Becket are the discovery and development of the process for reducing ores by silicon, which may be ranked with Goldschmidt's process of alumino-thermic reduction; the production of ferrovanadium on a commercial scale; early production of molybdenum by direct smelting and the manufacture of calcium carbide in 20,000-hp. units as compared with the former 500-hp. units. Mr. Becket's work has contributed largely to putting the ferrosilicon industry in its present important position. He was called upon during the war by the Government to assist in bringing the production of zirconium to the desired volume, and he accomplished this within four months. Since then he has continued the research to determine the effect of zirconium on steel and some highly important results of this work were presented last May before the American Electrochemical Society and published in THE IRON AGE, May 10, 1923. Mr. Becket is partly responsible for developing the Acker process to a manufacturing scale and his work in the elimination of impurities from tungsten ores and in devising new methods of analysis and testing are noteworthy. Twice he was a post-graduate student at Columbia University, first in 1898 and then in 1900, when he took special work in physical chemistry, industrial chemistry and metallurgy. At present his research work is carried on by a large staff in a laboratory in Long Island City known as the Union Carbide and Carbon Research Laboratories, Ltd.

Mr. Becket's Address

After the presentation of the medal, Mr. Becket read an address on ferroalloys and alloy metals, discussing ferrosilicon, ferromanganese, ferrochromium, ferrotungsten, ferromolybdenum, ferrovanadium, ferrotitanium and zirconium-silicon alloys. His testimony to the importance of ferrosilicon to the United States was impressive and his recital of some of the uses of silicon metal itself were particularly interesting. Silicon is now being produced containing 98 per cent silicon and with iron under 0.2 per cent. Interesting facts regarding the electric production of ferromanganese and the production of manganese metal were presented, followed by an extended discussion of ferrochromium, its use in industry and its importance as an alloy metal. Significant were the remarks regarding the future of stainless steel and rustless iron and the use of such alloys as chrome-iron and nickel and chromium in industry. Mr. Becket made public some work that had been done under his direction on vanadiferous sandstones and the production of ferrovanadium and vanadium alloys, and he closed with a discussion of some of the zirconium problems and the reiteration of his firm belief that zirconium occupies a unique position in metallurgy, both as a scavenger and as an alloying metal.

New building is going ahead without any indication of a decline, according to the December building review of Bradstreet's, which showed new projects in that month at a total value of 10 per cent more than the previous December, and was within 4 per cent of November, 1923. With 145 cities reporting, a total value of buildings permitted is estimated at $225,378,725, as against $234,839,611 for November, and $204,717,101 in December a year ago.

The Chicago Foundrymen's Club will meet at the City Club, Chicago, at 7 p. m., Saturday, Jan. 19. Except for the annual election of officers, the meeting will be devoted entirely to entertainment features.

Program for Rochester Sectional Meeting of the Steel Treaters

The technical program for the fifth sectional meeting of the American Society for Steel Treating, to be held at the Hotel Seneca, Rochester, N. Y., Jan. 31 and Feb. 1, is as follows:

"Some Carbon and High-Speed Steels Used in the Manufacture of Small Tools," illustrated with lantern slides and specimens, by A. H. d'Arcambal, chief metallurgist Pratt & Whitney Co., Hartford.

"Control of Production by Scientific Methods," by Prof. H. M. Boylston, head of department of metallurgy, Case School of Applied Science, Cleveland.

"Treatment of Tool Steel," by J. V. Emmons, chief metallurgist, Cleveland Twist Drill Co.

"The X-Ray and Steel," by Dr. Ancel St. John, of the research laboratory, Union Carbide & Carbon Co., Long Island City.

"Structure of Metals," by O. W. Ellis, assistant professor of metallurgy, University of Toronto, Toronto, Canada.

One of the features will be a joint banquet by the visiting members and guests, the Rochester chapter of the A. S. S. T. and the Chamber of Commerce, given in honor of Dr. George K. Burgess, president of the society. Dr. Rush Rhees, president of the University of Rochester, will act as toastmaster, and J. J. Desmond, chairman of the Rochester chapter, will be master of ceremonies. The subject of Dr. Burgess' address at the banquet at the Chamber of Commerce Building will be "The Relation of Government to Industry."

On Friday, Feb. 1, the board of directors will hold its regular meeting, while the members and guests will tour the industrial plants. Four have been chosen from among the many interesting ones in Rochester. At the Gleason Works, manufacturers of gears and gear-cutting machinery, things of special interest will be: Electric furnace for treating high-speed steel, electric furnace with automatic feed for treating gears, and electric core ovens in foundry department. The Taylor Instrument Co. will show the actual making of a thermometer and manufacture, assembly and testing of high-temperature pyrometers.

A complimentary luncheon will be served by Bausch & Lomb Optical Co. at their plant, after which a trip will be made through the glass-making plant and other departments, as well as the research laboratory of the Eastman Kodak Co.

Annual Meeting Associated Employers of Indianapolis

"Russia From Within" will be discussed by Jacob H. Rubin of Milwaukee, Wis., at the twentieth annual meeting of the Associated Employers of Indianapolis, Inc., and Dr. G. W. Dyer, professor of economics at Vanderbilt University, Nashville, Tenn., will speak on "The Law of Supply and Demand; Economics of Employment Relations." The meeting will be held Friday evening, Feb. 8, 1924, in the Indiana-Pythian Building.

Indiana Foundrymen to Meet at Purdue University

The engineering extension service of Purdue University, Lafayette, Ind., announces the second annual conference of Indiana foundrymen which is to be held at Purdue University on Jan. 17 and 18. This conference has been arranged in response to the many requests and has for its purpose the bringing together of the foundrymen of Indiana for the betterment of the foundry interests of the state.

The conference is to be held under the direction of the department of practical mechanics, and will consist of a series of papers and discussions treating the various features of the foundry business. The speakers have been chosen on account of their special fitness to present their subjects. Ample time will be given for the discussion of the papers and those present are urged to take part in this discussion. The first annual meeting of the Indiana Foundrymen's Association will be held on Thursday evening, Jan. 17.

Among those to present papers are E. J. Lowry, who will discuss "Metallurgy of Gray Cast Iron"; William Woodhall, National Car Coupler Co., Attica, Ind., "Manufacture of Steel Castings"; G. W. Gilderman, Dodge Mfg. Co., Mishawaka, Ind., "Making of Semi-Steel Castings," and W. K. Booth, Booth Electric Furnace Co., Chicago, "Electric Furnace Products in the Foundry."

Annual Meeting of New England Foundrymen's Association

The New England Foundrymen's Association held its twenty-eighth annual meeting and dinner on Wednesday afternoon and evening, Jan. 9, at the Exchange Club, Boston, some 190 members and guests attending. Following the dinner a musical entertainment was enjoyed. Charles A. Reed, Reed, Fears & Miller, Inc., Boston, was chairman of the committee on arrangements. George A. Ray, the Taylor & Fenn Co., Hartford, Conn., retiring president, presided at the business meeting and dinner.

The report of the secretary showed a total membership of 187, ten having been lost the past year and seven new members admitted. The following officers for 1924 were elected. Norman Russell, Albert Russell & Sons Co., Newburyport, Mass., president; R. F. Harrington, Hunt-Spiller Mfg. Corporation, Boston, vice-president; George H. Gibby, Gibby Foundry Co., East Boston, treasurer; and Fred F. Stockwell, Barbour Stockwell Co., Cambridge, Mass., secretary. Executive committee: H. P. Blumenauer, Arcade Malleable Iron Co., Worcester and Springfield, Mass.; H. S. Chaffee, Builders' Iron Foundry, Providence, R. I.; T. Officer, Sullivan Machine Works, Claremont, N. H.; Carl H. Neunan, Union Mfg. Co., New Britain, Conn.; and Charles A. Reed, Reed, Fears & Miller, Inc., Boston.

Electric Power Club Standards

Standards for electric power apparatus are covered in the fifteenth edition of the Electric Power Club Standards in a volume of 176 pages. The standards apply not only to nomenclature, graphic symbols, and abbreviations, but to general engineering matters, and particularly to different types of motors, both large and small, to generators, welding machines, mining and industrial locomotives, electric tools, industrial control equipment, transformers and switchboards, circuit breakers, storage batteries, etc. Direct current and alternating current machines both are considered, and a goodly amount of tabular matter is carried to describe and define the standards as applied.

This work of standards fits in with the schedules of other organizations, including the Association of Iron and Steel Electrical Engineers, and will be found useful by consulting engineers, central station men, electrical constructors and manufacturers of allied materials, and the electric departments of railroads, street railways, industrial concerns and other users of electrical equipment.

Inventions which have enlarged to a remarkable degree the production per worker were outlined in an address at Washington, Dec. 28, before the annual meeting of the American Economic Association and the American Statistical Association by Julius H. Barnes, president of the Chamber of Commerce of the United States. In the steel industry, he said, one or two men now with unloaders replace 12 to 20 men unloading by hand. In furnace charging, by use of skip hoist, larry car and automatic weigher, two men replace 14. In pig casting seven men with casting machine replace 60. In open-hearth operation one operator with charging machine replaces 40 hand chargers. With traveling cranes 12 men pouring replace 37. Two men unloading pig iron with electric magnet and crane replace 128.

Two Cabinet Members Fail to Agree

Secretary Hoover and Attorney-General Daugherty Discuss Rights of Trade Associations—Distribution of Information to Members a Matter of Controversy

BY L. W. MOFFETT

WASHINGTON, Jan. 15.—Correspondence on trade associations between Secretary of Commerce Herbert Hoover and Attorney-General Harry M. Daugherty, published last week, like previous communications between these two cabinet officers, still seems to leave a great deal to be desired in clarifying the status of trade associations. However, the informal opinion of the Attorney-General in his latest communication, in response to an inquiry from Mr. Hoover as to the effect of the consent decree in the District Court of the United State for the Southern District of Ohio, in the case brought by the Department of Justice under the Sherman anti-trust act against the Tile Manufacturers' Credit Association, does emphasize the inhibitions against trade associations that must be respected, in the opinion of the Department of Justice. This opinion has been interpreted as placing a drastic curb on many activities of trade associations and to limit their broader activities to distribution through the Government departments only. These particular activities, in the opinion of the Attorney-General, involve information relating to production, shipment, stocks on hand, and prices, but it could not be distributed among the association members themselves.

The Attorney-General made it plain that his views followed those expressed in the consent decree in both the tile and cement cases and said that he had expressed similar views in correspondence to Mr. Hoover in February, 1922, and that his opinion is supported by decisions of the Supreme Court of the United States, but that court will probably be appealed to again for definite decision.

Attitude of Associations

Mr. Hoover sought the opinion of the Attorney-General because the former said he thought that "there is a great likelihood that not only the associations from which this department now receives valuable statistics but a great many others will discontinue the collection of information and statistics as to production, shipments, stocks on hand, and the prices on closed transactions. They will not go to the expense of collection, if the only use that can be lawfully made of them is to transmit them to some governmental department. If this should happen, I fear that the efficiency of the department in carrying out the purposes set forth in the act creating it would be very greatly impaired.

"I respectfully request that you informally advise me, in view of the foregoing, whether or not this department should discontinue its present plan of cooperation with trade associations."

Mr. Hoover has not denoted what his attitude is since receiving the formal expression from the Attorney-General, and, therefore, it is not known whether he will ask trade associations to discontinue cooperating with his department. It has been assumed that he is studying the matter in conference with advisers and that he may call in representatives of trade associations to get their views.

The correspondence also has again developed speculation as to whether it will disturb trade associations to the point where some of them will dissolve, lest continuance of their work may involve prosecution by the Government. At the same time, it has been stated at the Department of Justice, since the correspondence was announced, that reports that it is opposed to business is wholly erroneous, but that on the contrary it supports the idea of trade association activities, provided they are legitimate. The department is known to feel that it has set forth a code as clearly as it can without committing itself to a more definite policy which might prove embarrassing.

Many Associations Operating Legally

The statement was made that the Department of Justice is of the opinion that between 85 and 90 per cent of the trade associations of the country are operating legally, and that even a greater percentage of them has been organized entirely for legitimate purposes but that some of them have extended their activities outside of the law. This view is accepted as more or less reassuring, although the doubt still existing is plainly a source of disturbance. But when the informal opinion of the Attorney-General is kept in mind, it would appear that these activities must be through a Government department.

Regret over the continued correspondence between Mr. Hoover and Mr. Daugherty was expressed by Nathan B. Williams, associate counsel of the National Association of Manufacturers, who said that it had not contributed to the clarification of the situation and he suggested that trade associations would doubtless continue their activities; but likely would decline to supply information to the Government except that which is provided by the law. The statement of Mr. Williams is as follows:

"It is sincerely to be regretted that, on a question of vital public policy, interesting alike to the business community and all who buy or consume the products of our industry, the Secretary of Commerce and the Attorney-General of the United States engage in 'informal' letter writing. This extensive correspondence makes slight, if any, contribution to the clarification of the law concerning the statistical activities of trade associations.

"Apparently, legitimate trade associations will continue their statistical and other activities without reference to this 'informal' correspondence; that they will not transgress the well known inhibitions of existing law, in that they will not misuse their statistical or other trade information in promotion or furtherance of any agreement or conspiracy to fix prices, limit production, restrict sales, divide territory, or otherwise restrain lawful competition in commerce; and it appears likely that they will decline to supply any such information to any department of the Government except that which may be called for by statute under the provisions of the laws providing for the taking of decennial and other censuses."

The Attorney-General's Response

After summarizing his position, the Attorney-General in his letter to Secretary Hoover said:

"This is but a statement of the position I feel impelled to take as Attorney-General of the United States,

(*Continued on page* 263)

FORD MOTOR CO. PLANS

Extensive Additions to Plants and Some Entirely New Enterprises

Such activity as came to the motor industry in 1923 was not dreamed one year ago, yet the Ford Motor Co. sees even greater achievements for 1924. In a recent statement by the president of the company, Edsel B. Ford, one reads, "There is every reason to believe that in 1924 business will attain to far greater proportions."

A statement, said to have emanated from an official close to Mr. Ford, mentions improvements calling for an expenditure of $110,000,000 to $150,000,000 during the year, including the following: Extensive improvement of waterways looking to the development of an all-water route from Green Island, N. Y., to Detroit; completion of a plant, the erection of which has been started, at St. Paul, Minn.; an addition to the Kansas City assembly plant and extension of business throughout the South and West. Construction is to be begun early in the year on a new assembly plant at Philadelphia. Hegewitch plant at Chicago, where, in addition to the assembly of 600 cars and trucks per day, all closed car bodies required in the Chicago district will be manufactured. An addition to the Kansas City assembly plant, increasing floor space 168,000 sq. ft., and a new sales and service branch at Salt Lake City.

It is announced that new coke ovens, now under construction at the River Rouge plant in Detroit, will be in operation, together with a cement plant of 1000 daily capacity from blast furnace slag. It is also planned to extend the Highland Park plant and tributary railroad facilities. A new body factory and wood distillation plant will be opened soon at Iron Mountain, Mich. Increased production is forecast for the Flat Rock, Mich., plant and for the wheel plant at Hamilton, Ohio, "to keep abreast of growing requirements."

Buildings for the new Ford plant at Green Island, N. Y., are now completed and production of gears and radiators begun last year will be increased as machinery is installed.

Iron Ore Resources of Sweden

STOCKHOLM, Dec. 31.—The iron ore resources of Sweden have been found to be so great that they will meet all demands, both for export and domestic consumption, for hundreds of years to come. This appears from a voluminous official report, just published, by a government committee of mining experts, which has been conducting deep-borings in the iron mining region of Northern Sweden ever since 1913, and which has thus discovered that the estimate of 740,000,000 tons of ore deposits in the Kiruna mines alone, drawn up in 1913, was entirely too conservative. Ten years ago the borings in this district had gone down only about 1000 feet, but the new borings now completed have reached a depth of over 2000 feet below the surface of Lake Luossajarvis, and the tests show that the ore area widens at greater depths and that the percentage of high grade ore at these depths is greater than at the surface. In fact, it is now estimated that the deposits in the Kiruna district alone total about 1,500,000,000 tons.

The fact that high grade ore increases with the depth is extremely important, according to the Swedish Minister of Commerce, who comments on the report. The ore in question is the so-called "A ore," which contains less than 0.01 per cent of phosphorus, and in which the iron content is 68 to 69 per cent. Ore of this grade, which makes up 9 per cent of the ore at the surface of Kiruna Mountain, and 30 per cent at the lake level, has been found to constitute 60 to 70 per cent of the total deposits at the deeper levels. This is the quality of iron used in high grade machine, tool, and instrument manufacture, and the commercial significance of the discoveries is evident. At present much of the "A ore" mined in Sweden is reserved by Government decree for home manufacture, and the volume of exports has been limited.

Iron mining at Kiruna is extremely simple. It consists of slicing the top off the mountain, and, as the workers are still upwards of a thousand feet above the level of the nearby lake, the methods are not likely to change for many years.

No Change in Woven Wire Fence Simplification Program

The standing committee on woven wire fence met at the Department of Commerce today to study the status of the woven wire fence simplification program adopted by 90 per cent of the industry under date of Sept. 1, 1923, and decided to let present plans remain in force without change until the next scheduled meeting in July.

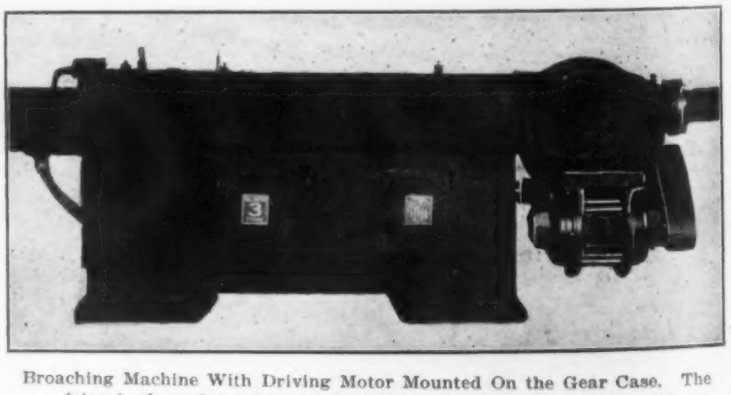
The recommendation as it now stands embodies the work of a general conference of all interested called in July, 1923, by the division of simplified practice of the Department of Commerce at the suggestion of the National Fence Manufacturers Institute to consider possible elimination of needless styles, sizes, etc., of woven wire fence.

Reductions from 552 styles of woven wire fence to 69 and reduction from 2072 sized packages to 138, resulted from the July conference.

Broaching Machine with Motor Drive

The No. 3 high-speed rack type broaching machine of the American Broach & Machine Co., Ann Arbor, Mich., is being offered with motor drive arranged as shown in the accompanying illustration.

The motor is suspended from the gear case and the drive is through a silent chain. The arrangement of the drive mechanism within the machine is the same as in the company's standard rack-type broaching machine, being through a hardened worm, bronze worm gear and through hardened pinions that engage in a D-shaped rack. It is claimed that the machine will make a complete stroke with a 4-ft. broach, cutting and returning to the starting position, in approximately 24 sec. The return stroke is three times as fast as the cutting stroke. Being operated by a rack, the machine delivers a direct pull to the sliding head, which is said to eliminate twisting action and prolong the life of the ways of the machine. This arrangement is also intended to permit accurate work and longer life of broaching tools.



Broaching Machine With Driving Motor Mounted On the Gear Case. The drive is through a silent chain. Stops permit stroke adjustment

The machine is fitted with automatic stops which are adjustable for various strokes, and is capable of operating broaches up to 58 in. long.

A galvanized sheet division of the National Association of Sheet and Tin Plate Manufacturers has been organized, for cooperation with the American Zinc Institute, New York, and other agencies related to the field of galvanizing.

Electrical Developments During 1923*

Increased Size of Units a Feature—Transportation Problems Afloat and in Air—High-Pressure Turbines Mark Progress

THROUGHOUT the electrical industry the year 1923 was characterized by a record volume of production in practically all classes of apparatus, exceeding in many cases the maxima of wartime output.

General Electric Operations

RECENT tendency toward increased unit capacity continued in evidence. The 62,500-kva. turbine generator, the first of two 65,000-kva. waterwheel generators, and a synchronous converter of record size were completed by the General Electric Co., while various types of transformers exceeded the record unit ratings of previous years.

In transportation, electric propulsion was for the first time applied to large cargo craft for canal service and improvements were made in auxiliary ship equipment. The more important railroad developments occurred in foreign countries, as in the preceding year, and the high voltage direct current system was utilized to a large extent for main line steam railroad electrification. In street railway service there was a further adoption of the economical light-weight double-truck car.

Turbines

Developments during the year on large turbines consisted of refinement in mechanical details without radical changes in construction. The outstanding features were the production of turbines for high steam pressure conditions and the production of turbines in unprecedented volume. Shipments for 1923, exclusive of turbines for mechanical drive and ship propulsion, had a total capacity of approximately 1,660,000 kw. This was an increase of 85 per cent over the average for the preceding five years and an increase of 32 per cent over the maximum wartime production in 1917.

The first of the 35,000-kw. turbines designed for 550-lb. steam pressure and 750 deg. Fahr. total steam temperature was completed and shipped, while four of the same capacity and one 60,000-kw. compound unit to operate under similar steam conditions were under construction.

The first commercial equipment, which includes a mercury boiler and turbine exhausting into a condenser boiler, which in turn generates steam for an existing steam turbine station, was put in service in the fall of 1923.

In addition to this there were under construction one 2600-kw. and one 4000-kw. turbine designed for a steam pressure of 1000 to 1200 lb. and to exhaust into headers supplying other turbines at from 250 to 350 lb.

Supercharger and Electric Propulsion

A new turbine supercharger for airplanes was designed and built, specifically for extreme altitude operation. It is rated to feed sea-level atmospheric pressure to the engine at a height of 35,000 ft., or about twice the rating of the one used in the previous American altitude record flight.

The supercharger consists of a turbine compressor mounted just back of the propeller blades of the plane, on the front end of the Liberty motor, and is operated from the exhaust gases from the airplane motor, which ordinarily go to waste. It weighs about 140 lb., which might be considered a handicap in altitude flying but for the fact that, at 35,000 ft., its operation will increase the power of the Liberty motor by at least 280 hp., or about 2 hp. for each additional pound carried.

Diesel-electric propelling equipments were adopted for two ships of a new type, built for refrigerating cargo service on the Great Lakes and New York State canal system and for coastwise trade to the West Indies during the winter. The first of these ships, the Twin Ports, 258 ft. overall and 42 ft. beam, with a full load draft of 13 ft. and a cargo capacity of 2600 tons, started commercial operation in September. The electrical equipment comprises two 250-kw., 230-volt, 260-r.p.m. direct current generators direct driven by two Diesel engines and two 250-hp. motors direct connected to twin propeller shafts, which give a speed of 13 miles per hour at full motor load.

Industrial Motors and Control

Early designs of the single-phase motor—an important factor in many industrial applications—had certain electrical and mechanical characteristics which tended to limit the field of its practical utility. A new type single-phase motor which operates on the squirrel cage induction principle has been developed which eliminates the short circuiting switches heretofore considered essential.

A complete new line of 40-deg. continuous duty riveted frame polyphase motors in sizes up to 15 hp. has been designed, with numerous improved electrical and mechanical characteristics as compared with previous construction for this class of motor.

During the year considerable work was done toward standardizing the bores of small high-speed motors used generally by the woodworking trade. Before this standardization there were a great many different bore dimensions for the same frame, which was decidedly objectionable from a manufacturing standpoint.

Steel Mills

There was added to the existing main roll drives of 300 hp. and over, 44,100 hp. (normal continuous rating), bringing the total to 612,110 hp. The tendency toward the use of high-speed motors with reduction gears, which has been marked for the last few years, continued to gain headway and over 90 per cent of the new motors were for geared drive.

One of the most important developments of the year was the building of alternating current brush-shifting motors with shunt characteristics. Two machines of this type, which gives adjustable-speed without auxiliary apparatus, were under construction for the Halcomb Steel Co., Syracuse, N. Y., for driving merchant mills.

Induction Furnaces

The new type of induction furnace, which utilizes the force of electro-magnetic repulsion existing between transformer primary and secondary windings to cause a circulation of molten metal between the heating circuit and the melting pot, was operated only experimentally during 1922. Fifteen 75-kw., 1200-lb. induction furnaces were placed in commercial operation for melting non-ferrous metals in 1923 and a number of additional units were under construction. A notable accomplishment of the repulsion-induction furnace was the successful melting of pure copper on a commercial basis.

The largest horizontal ring-type induction furnace in the United States was built for installation at the Allegheny Steel Co. It has a maximum capacity of 6 tons and in normal service will melt 3 tons every 3 hr.

Industrial Heating

For the first time the electric furnace was used successfully for the bright annealing of copper wire. An-

*From reviews prepared by John Liston, General Electric Co., Schenectady, N. Y., and H. W. Cope, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

other special furnace was developed for annealing steel punchings used for field and armature laminations. It is built 6 ft. above the floor on a structural steel support and the laminations are placed on a car which is rolled under the furnace and raised into the heating chamber on a hydraulic platform. Around the edge of the car is a sand seal which makes the furnace air tight when the car is in place.

Westinghouse Developments

GENERATING unit size continues to increase year by year. It is worthy of note that a 62,500-kva. steam turbine generator is being installed. A 43,750-kva., 1800-r.p.m. machine under construction is the largest steam turbine generator of this speed ever built. There is also under construction a 62,500-kva. cross compound unit, consisting of one 25,000-kva. generator and one 37,500-kva. generator.

A 62,500-kva. cross compound unit consisting of two 31,250-kva. generators is being built. In connection with both of these cross compound units and other large single generator units there have been developed 1800 r.p.m. a.c. generators for direct connection to the main turbine, constituting an independent source of power for electrically driven auxiliaries. This is a new development, these direct-connected a.c. generators replacing separate turbine generator units.

Electric Furnaces

The year witnessed the installation of the world's largest arc furnace. This is a 60-ton maximum capacity furnace.

In conjunction with electric heating apparatus, furnaces for vitreous enameling of metal ware have been developed. This type of bath tub furnace appears to be particularly successful, and the extension of its use is practically assured.

The arc furnace automatic regulator developed by the company has been brought to a higher degree of perfection than ever before.

Steam Turbines

There are embodied a number of novel features in the new 20,000-kw. and 30,000-kw. turbines. The frames are designed for the ratings with the higher steam pressures, superheat and vacuum prevailing in most modern stations today. Under certain conditions, an overload of 25,000 and 35,000-kw. respectively can be obtained on the tertiary valve.

Considerable time has been spent on the study of a turbine for 1200 lb. steam pressure and final designs are now in progress. This will be a reducing turbine having an exhaust pressure of 300-lb. gage, which condition led to the development of a special high-pressure gland, known as the boiler feed pump type of gland, wherein condensate from the main condenser is used as sealing water. The gland acts as a stage heater and retains in the system most of the heat which would otherwise be lost through friction and condensation in the gland.

After complete studies and the preparation of many designs for a single-cylinder type of 50,000-kw. turbine for standard operating conditions of 325 lb., 200 deg. superheat and 29 in. vacuum, it became obvious that machines of this size should be built as cross compound units with elements running at 1800 r.p.m. rather than a single 1200 r.p.m. unit. A single-cylinder unit would involve a rotor weight of 120 tons and preclude the possibility of shipment without taking the rotor to pieces.

A 50,000-kw. unit has been designed as a three-cylinder machine, the high-pressure and intermediate-pressure elements being connected tandem to one generator and the low-pressure element being a double-flow machine driving a generator, all elements running at 1800 r.p.m. One novel feature of this unit is the use of twin vertical surface condensers, one on each side of the machine, with their upper water boxes above the engine room floor. The steam leaving the high-pressure turbine is conducted to the boiler room and reheated to 700 deg. Fahr. before entering the intermediate-pressure element and many special problems were introduced by reason of the high temperatures resulting from this arrangement.

After careful study the high-pressure and intermediate-pressure elements were separated so that they might expand freely. On account of the comparatively large volume in the reheater and its connected piping, containing steam no longer under control of the regular turbine governor, special arrangements for governing are required to prevent the turbine overspeeding in case of a sudden large reduction in load. As this machine is designed for 600 lb. initial steam pressure, special pipe flange standards are necessary.

Steel Industry

Among distinctive installations of electrical equipment for rolling mill drives made during the past year is the apparatus supplied for operating a 16-in. hot strip mill. The roughing stands of this mill are driven through herringbone gear units by two 1500-hp., 705-r.p.m. induction motors with liquid slip regulator control. The four finishing stands are arranged to form a continuous train, each stand being driven by a separate compound-wound 240-volt direct current motor. Two of the motors are rated 1500 hp. at 125 to 250 r.p.m. and two are rated 1800 hp. at 165 to 350 r.p.m.

These motors are designed with such close inherent speed regulation that they operate throughout their range without any automatic speed regulating control. This is the first installation of a drive for a continuous hot strip mill train which has been operated without special control for maintaining correct speed. Power for the d.c. motors is supplied by two synchronous motor generator sets each consisting of two 1000-kw. 600-volt generators and a synchronous motor.

Two 5000-hp., 370-r.p.m. induction motors were placed in operation. One motor drives a 90-in. three-high plate mill and the other a 132-in. three-high plate mill. Both motors replaced steam engines.

Notable among foreign orders is one covering complete electrical equipment for a blooming mill, a structural mill and a three-high plate mill. For the blooming mill a 5000-hp., 700-volt d.c. single unit reversing motor operating from zero to 120 r.p.m. will be supplied. This will be the largest single unit reversing motor in operation. For the structural mill there will be a 3750-hp., 700-volt reversing motor having a speed range of zero to 150 r.p.m. These two motors will be supplied with power from a flywheel motor-generator set consisting of one 3500-kw. d.c. generator, one 3000-kw. d.c. generator, one 180,000-lb. flywheel and a 5000-hp. induction motor. A 3000-hp., 735-r.p.m. induction motor with herringbone gear unit will be supplied for the plate mill.

Orders have been received for equipment to drive a 40-in. reversing blooming mill and a 48-in. universal plate mill. The equipment for the 40-in. blooming mill consists of a 7000-hp., 700-volt, 0 to 120-r.p.m. double unit reversing motor; a flywheel motor-generator set having two 3000-kw. generators, one 100,000-lb. flywheel and one 3750-hp. induction motor; with complete switchboard and control. Both equipments will replace steam engine drives.

An order has been placed for equipment to replace engine drives on a 24-in. structural mill and a 22-in. bar mill. The 24-in. structural mill drive consists of a 3000-hp., 600-volt, 325 to 485-r.p.m. d.c. motor connected to the mill through a herringbone gear unit; a flywheel motor-generator set consisting of a 2500-kw. generator, 60,000-lb. flywheel, 2500-hp. induction motor, together with switchboard and control. A 2500-hp., 500-r.p.m. induction motor with liquid slip regulator control will be supplied for the bar mill drive.

The largest ore transfer car was put in service during the year. This car was equipped with Westinghouse motor and control.

An order for a 612-ft. freight boat for the Great Lakes has been placed by Herbert K. Oakes, Cleveland, with the Great Lakes Engineering Works, Detroit. This will be a duplicate of the two boats recently ordered by the Ford Motor Co. The new boat will be operated by the Franklin Steamship Co.

Iron Ore Produced in 1923

The iron ore mined in the United States in 1923, exclusive of ore that contained more than 5.5 per cent of manganese, is estimated by the Department of Interior at 70,018,000 gross tons, an increase of 49 per cent as compared with that mined in 1922. The ore shipped from the mines in 1923 is estimated at 70,433,000 tons, valued at $244,749,000, an increase of 39 per cent in quantity and of 55 per cent in value as compared with the figures for 1922. The average value of the ore per gross ton at the mines in 1923 is estimated at $3.47; in 1922 it was $3.12. The stocks of iron ore at the mines, mainly in Michigan and Minnesota, apparently decreased from 10,524,279 tons in 1922 to 10,314,000 tons in 1923, or 2 per cent. The production for 1923 appears to be the third highest in the history of iron mining, having been exceeded only by that of 1917 and 1916.

These estimates, which are based on preliminary figures furnished by producers of about 98 per cent of the normal output of iron ore, are made by Ernest F. Burchard and Hubert W. Davis, of the Geological Survey, Department of the Interior. They show the totals for the principal iron ore producing States and, by grouping together certain States, the totals for the Lake Superior district and for groups of Southeastern, Northeastern and Western States.

Lake Superior District

About 85 per cent of the iron ore shipped in 1923 came from the Lake Superior district, in which 59,976,000 gross tons were mined and 60,009,000 tons were shipped, increases of about 51 and 38 per cent, respectively, as compared with the quantities mined and shipped in 1922. The ore shipped in 1923 was valued at $220,710,000, an increase of about 52 per cent. These totals include the ore from the Mayville and the Baraboo mines in Wisconsin and ore shipped by rail as well as by water from all mines, but exclude manganiferous ores that contained more than 5.5 per cent manganese. The ore is chiefly hematite. The stocks of iron ore in this district apparently increased from 9,059,947 tons in 1922 to about 9,285,000 tons in 1923, or 2 per cent. The shipments of iron ore by water from the Lake Superior district in 1923 (including manganiferous iron ore), according to figures compiled by the Lake Superior Iron Ore Association, amounted to 59,036,704 gross tons, an increase of 39 per cent as compared with these shipments in 1922. The average value of the ore at the mines in the Lake Superior district in 1923 per gross ton was $3.68; in 1922 it was $3.33.

The mines in Minnesota furnished 74 per cent of the total iron ore shipped from the Lake Superior district in 1923 and 63 per cent of the total of the United States. The mines in Michigan furnished 24 per cent of the lake shipments and 20 per cent of the grand total.

Other States

The Southeastern States, which constitute the second largest iron ore producing area, including the Birmingham and Chattanooga districts, mined 7,533,000 tons of iron ore in 1923, an increase of 36 per cent as compared with 1922. The shipments of ore from these States to blast furnaces in 1923 amounted to 7,716,000 tons, valued at $16,778,000, an increase in quantity of 38 per cent and in value of 73 per cent as compared with the quantity and value of shipments in the previous year. The ore consists mainly of hematite, with brown ore and magnetite next in order. The average value of the ore produced in these States in 1923 per gross ton was $2.17; in 1922 it was $1.74.

The Northeastern States, which include the Adirondack district, New York, and the Cornwall district, Pennsylvania, in 1923 mined 1,823,000 tons of iron ore and shipped 2,029,000 tons, an increase of 39 per cent in the quantity mined and of 90 per cent in the quantity shipped in 1922. The average value of the ore in these States in 1923 per gross ton was $2.82; in 1922 it was $2.33. Most of this ore is magnetite.

It is estimated that the Western States mined 677,000 tons of iron ore and shipped 679,000 tons, valued at $1,536,000 in 1923, an increase of 38 per cent in the quantity mined and of 91 per cent in the value of the ore shipped, as compared with 1922. The ore comprises hematite, magnetite, and brown ore.

Imports and Exports

The imports of iron ore for the 11 months ended Nov. 30, 1923, amounted to 2,611,240 tons, valued at $10,459,948, or $4.01 a ton. The imports for the year 1922 were 1,135,156 tons, valued at $4,916,294, of $4.33 a ton. The exports of iron ore for the 11 months ended Nov. 30, 1923, amounted to 1,116,600 tons, valued at $5,304,645, or $4.75 a ton, as compared with exports for the entire year 1922 of 602,194 tons, valued at $2,770,878, or $4.60 a ton. The statistics of imports and exports were compiled from the records of the Bureau of Foreign and Domestic Commerce.

Bauxite in 1923

About 500,000 gross tons of bauxite were produced in the United States in 1923, according to estimates given out by the Department of the Interior through the Geological Survey. This quantity is equal to the largest annual domestic production before the World War. The largest producer was the American Bauxite Co., whose plant at Bauxite, Ark., is said to have handled about 1000 tons a day. Three other companies also mined bauxite in Pulaski and Saline counties, Arkansas. The operations in the Eastern fields were less extensive.

The imports of bauxite, most of it from South America, but some from France and Dalmatia, amounted to 8500 tons a month, indicating a total for the year of 102,000 tons, as compared with 23,656 tons in 1922. All the bauxite received from South America came entirely from British Guiana. This bauxite, which is said to be of excellent grade, was used by manufacturers of aluminum and aluminum salts. It can probably be landed and sold at Eastern markets cheaper than domestic bauxite, even after the import duty of $1 a ton has been paid and its importation will seriously affect the business of some domestic bauxite miners. A large drying and loading plant was erected on Cottica River, 100 miles above Paramaribo, Dutch Guiana, from which bauxite will be exported in 1924.

Domestic bauxite was quoted at $6 to $9 a ton until June, 1923, but afterward the quotations on all grades dropped 50c. per ton. Foreign bauxite was quoted $1 lower than domestic until the price was reduced, when the difference was only 25c. a ton.

Magnesite During 1923

The demand for caustic calcined magnesite, which was particularly active in 1923, was met by producers in both California and Washington, according to the U. S. Geological Survey. Dead-burned magnesite was supplied from mines in Washington and California, but this trade was not so good as it might have been because of the large stocks of Austrian magnesite imported before Sept. 1, when the new tariff went into effect. In 1923 the domestic production of calcined magnesite, including dead-burned magnesite, will probably exceed 70,000 net tons, equivalent to 154,000 tons of crude magnesite. This is practically three times as much as the production in 1922 and is nearly equal to the peak output before the war. The production was about equally distributed between California and Washington.

The imports of caustic calcined magnesite for the first nine months of 1923 were 11,536 tons, of which about 55 per cent came from India and most of the rest from Greece. During the same period 47,194 tons of dead-burned magnesite were imported, largely from Austria. This makes a total of 58,730 tons for the nine months, as compared with 72,265 tons of calcined imported in 1922.

Electric Furnace Phenomena

Results of Comprehensive Tests on a 6-Ton Heroult Furnace— Long Series of Questions Answered— Limiting Capacities Outlined

BY EDWARD T. MOORE*

WHEN plans were made by the electric furnace committee for the 1921 report it was decided to outline the details of an elaborate series of tests covering the collation of operating data of electric arc furnaces, and in addition carry on research work along the following lines:

1. A thorough study of the heat losses from electric furnaces.

2. Presentation of operating data on furnace electrodes according to the electrode specifications drawn up by this committee and presented in the 1920 report.

3. An investigation of the merits of dual voltages, and the deleterious effect on the metal, if any, of a relatively high voltage for melting.

4. Investigation of electric furnace phenomena.

Due to business conditions during the year 1921 practically no electric furnaces were operating, but by July, 1922, production was regular and conditions satisfactory for test work. These investigations were started, therefore, on a standard 6-ton counter-weight type Heroult furnace, but it was impossible to analyze properly the large amount of data secured in time for the 1922 convention. This work has since been done and forms the committee's report for 1923.

Investigations 1, 2 and 3, to be undertaken by the committee, are postponed until later.

Tests were made on one of the Halcomb Steel Co.'s 6-ton Heroult furnaces, known as No. 5. This furnace, of the counter-weight type, has connected to it three 500-kva. single-phase self-cooled core type transformers, manufactured by the General Electric Co. These have 11,300 volts primary to 120 volts secondary, delta connected for melting, with switching equipment to connect the transformers in star on the high tension side to provide a secondary voltage of 70 for refining. The inherent reactance of the transformers is approximately 5 per cent.

Data from three heats appear in the table. In each case the charge was composed of boiler clips and punchings, washed metal and a small amount of mixed scrap.

Answers to a series of definitive questions are covered in the following paragraphs, as determined by the test results.

1. The question asked the greatest number of times, particularly by central stations, was the degree of unbalancing between phases.

Results: The amount of unbalancing is considerable on an individual furnace. This is further substantiated by graphic meter charts of the kw. input of the total 3-phase power, and by the total kw. input to phases 1, 2 and 3. The maximum difference between phases was 340 kw., or 21 per cent of the connected load. This is not of such magnitude as to affect operation; in fact, with additional furnaces or other loads this diversity would undoubtedly still further reduce the unbalancing.

2. What maximum current values are reached during the melting period? Previous tests on furnaces indicated highest value was 3.61 times normal.

Results: Maximum current values are shown as 147, 140.5, 67.5, 45.3, 117.5 and 138.6 amperes, respectively. The greatest value was 1.1 times normal. Also in the short-

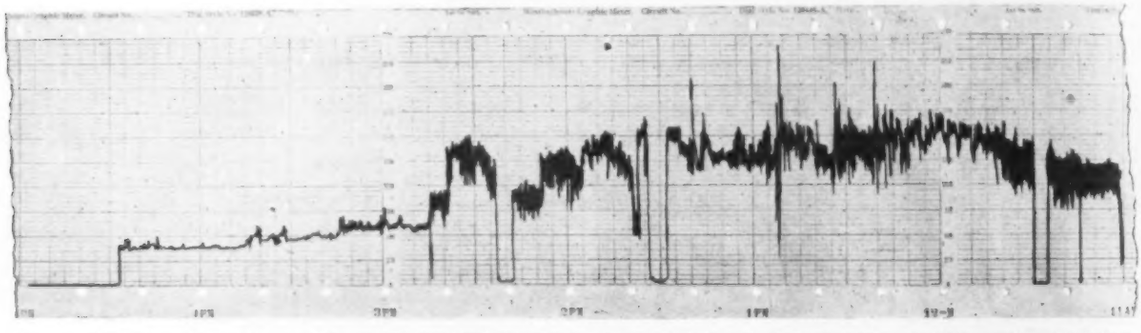


Fig. 1—Record of Heat No. 14,612, of Chrome-Nickel Steel, with a Melting Period of 2 Hr. 40 Min. and a Refining Period of 2 Hr. 50 Min. As is usual in electric furnace practice, the latter portion of the refining period was at a lowered power consumption

Particulars of Three Heats and Analyses of Steel Produced

Steel Made	Heat No. 14612 Chrome Nickel Steel	Heat No. 14616 Chrome Nickel Steel	Heat No. 14620 Nickel Steel
Total time to charge (by hand)	36 min.	32 min.	45 min.
Melting started	11:00 a. m.	10:45 a. m.	12:20 p. m.
Melting completed	1:40 p. m.	2:40 p. m.	3:00 p. m
Refining started	1:40 p. m.	2:40 p. m.	3:00 p. m.
Furnace tapped	4:30 p. m.	5:20 p. m.	4:55 p. m.
Length of melting period	2 hr. 40 min.	3 hr. 55 min.	2 hr. 40 min.
Length of refining period	2 hr. 50 min.	2 hr. 40 min.	1 hr.55 min.
Total length of heat.	5 hr. 30 min.	6 hr. 35 min.	4 hr. 35 min.
Power used for melting	3,460 kwhr.	3,350 kwhr.	3,380 kwhr.
Power used for refining	1,940 kwhr.	1,840 kwhr.	1,170 kwhr.
Total power for heat.	5,400 kwhr.	5,190 kwhr.	4,550 kwhr.
Total net weight of ingots	13,560 lb. or 6.728 tons	13,090 lb. or 6.545 tons	12,900 lb. or 6.45 tons
Kwhr. per net ton of ingots	803	793	705

Percentage Analysis of Metal

Heat No.	Carbon between	Carbon under	Silicon under	Manganese under	Phosphorus under	Sulphur under	Chromium between	Nickel between
14612	0.10-0.15		0.32	0.50	0.025	0.025	1.00-1.50	3.75-4.25
14616	0.10-0.15		0.35	0.50	0.025	0.025	1.00-1.50	3.75-4.25
14620	0.10-0.15		0.35	0.50	0.025	0.025	.....	2.75-3.75

Notes: Heat 14616 interrupted 1 hr. 15 min. by power being off due to a damaged breaker caused by short circuit test.

Heat 14620, 25 min. delay to patch furnace, and 10 min. delay to place new electrode.

*Electrical engineer, Halcomb Steel Co., Syracuse, N. Y., and consulting engineer, Crucible Steel Co. of America, New York. This is an abstract of the paper read at the Buffalo convention of the Association of Iron and Steel Electrical Engineers.

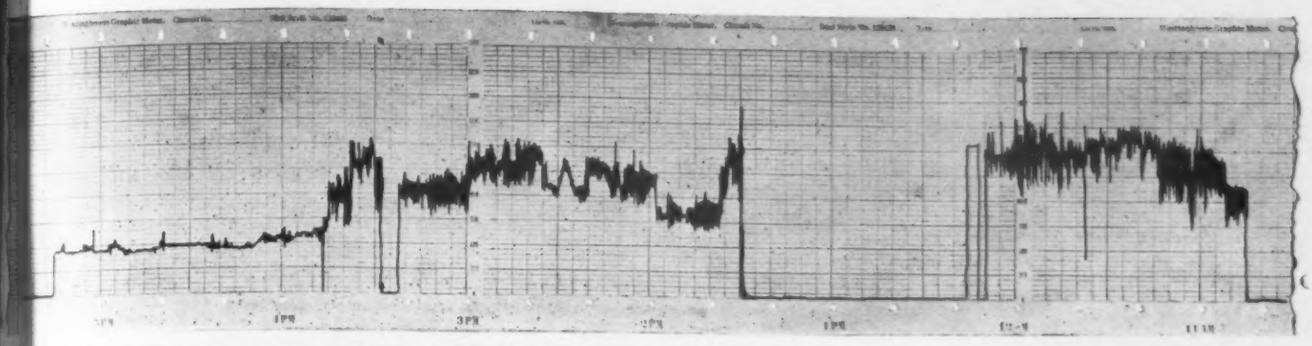


Fig. 2—Heat No. 14,616, of Chrome-Nickel Steel, Showed a Melting Period of 3 Hr. 55 Min., Power Being Off for More Than 1 Hr. of This Time

circuit test the maximum short-circuit value was found to be 3.66 times normal. This checks remarkably closely with previous tests where the highest value was 3.61 times normal.

3. Determine if arcs in furnace set up high-frequency disturbances. Our previous tests indicate between 6,000 and 9,000 cycles.

Results: A chart of secondary voltages shows waves of unmistakably high frequency; these are of the order of 5,000 cycles approximately.

4. From the current grams determine if the waves are not symmetrical, if partial rectification occurs. Our previous tests indicate slight rectification.

Results: Two grams of primary current waves and voltage show considerable distortion. Higher harmonics are indicated by the varying waves from above and below the zero line, and rectification is indicated by the flattened characteristics of the wave as it passes through zero. Measurements made with a millivolt meter show a maximum value of 5 millivolts. Rectification was quite continuous. Reversal of the rectified current was plainly indicated on the indicating millivolt meter.

5. Results: During all of these tests no evidence of a resonance condition was observed nor of a high voltage.

6. Results: Additional reactance in the line will reduce power factor and to a large extent reduce the amplitude of load peaks or swings. Wave shape will also be affected by additional reactance and harmonics somewhat smoothed out. Since the reactance used in these tests was only 3 per cent, it was hardly of sufficient value to have a material effect in the phenomena.

7. Does an electric furnace operate at reasonably high power factor so that the power factor clause in central station power contracts will not add an additional amount to the cost of power?

Results: From Fig. 4 of a polyphase power factor meter the variations in power factor during a heat can be checked. During melting, when the load is high and the fluctuations violent, the power factor averages 91 per cent. During refining, when the load is steady at approximately one-third value, power factor averages 88 per cent. The chart illustrates, of course, the instantaneous values which are affected by the load variations. To arrive at a correct average power factor value numerous readings, taken with a reactive kilovolt ampere meter, gave the following average power factors: Melting period, 90 per cent; refining period, 88 per cent; for entire heat, 89 per cent. Thus an electric furnace such as the one under test is a very desirable load from a power factor standpoint and will always operate at a higher power factor than induction motors. In some instances, where the reactance of a furnace circuit is relatively high, the average operating power factor will be much lower than above, but there will be few cases where such values will be low enough to cause a penalty. There are, of course, some central stations which require a power factor of at least 90 per cent to be maintained, in which instance the power rate of an electric furnace may possibly be increased because of not being able to maintain such high power factor. The furnace under test, however, could easily average 90 per cent, but in installations where this could not be possible at least 85 per cent should easily be met.

8. Results: Experience indicates that transformers for electric furnaces should be built with an inherent reactance of approximately 5 per cent and that additional reactance, necessary to cut down current values to a proper extent, should be incorporated in the circuit as external reactors. These external reactors can then be equipped with taps so that adjustable amounts of reactance can be added as required. This external reactance will, of course, have to be of greater value for use on 25 cycle circuits than when used on 60 cycles.

9. Results: The burning out of the back wall in a

(*Continued on page* 261)

Fig. 4—(Right) Polyphase Power Factor of the Load, Averaging Close to 90 Per Cent, Lagging

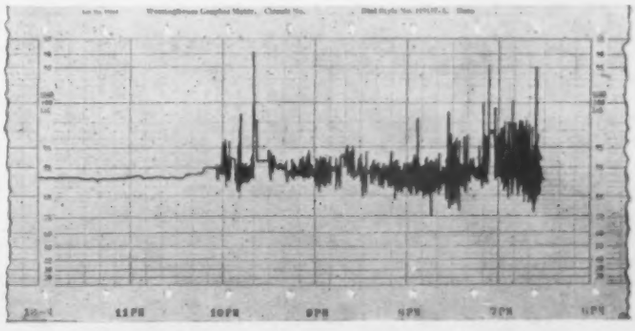
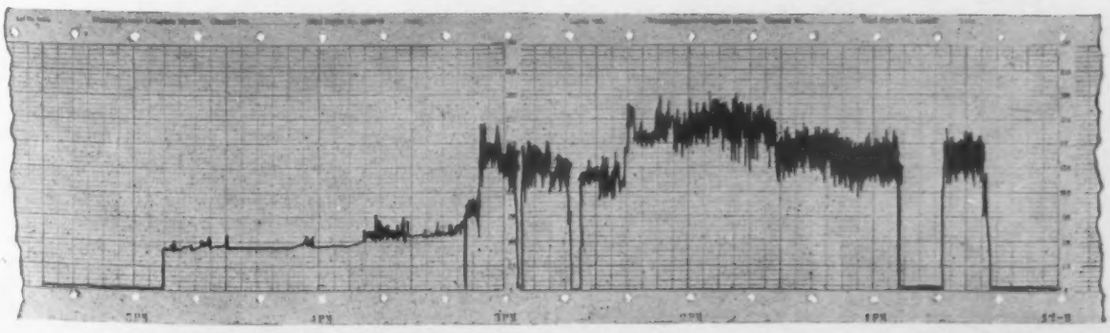


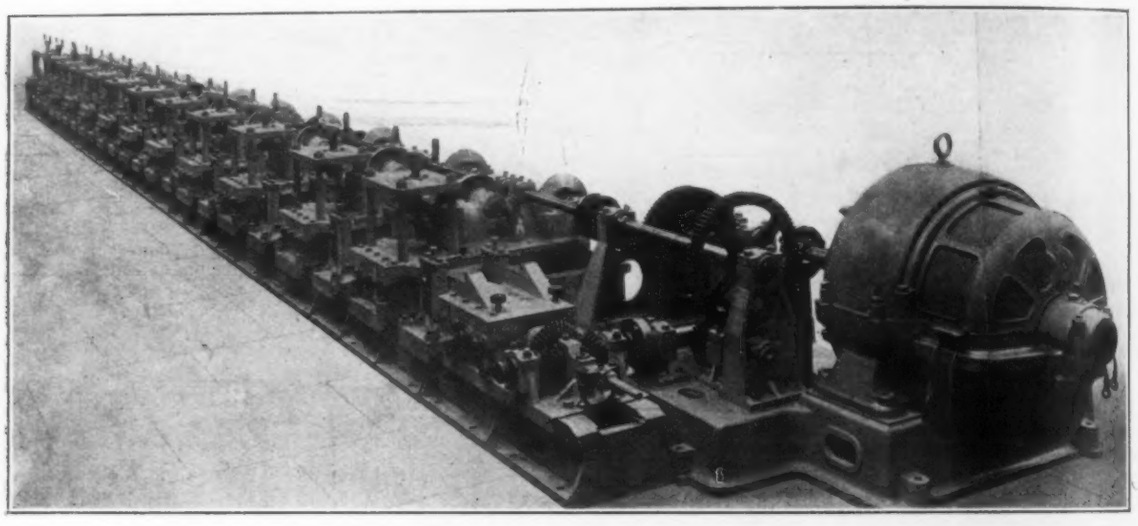
Fig. 3—(Below) Heat No. 14,620, of Nickel Steel, Showed a Much Shorter Refining Period Than Either No. 14,612 or No. 14,616, With Consequent Saving in Current Consumption Per Ton of Ingots



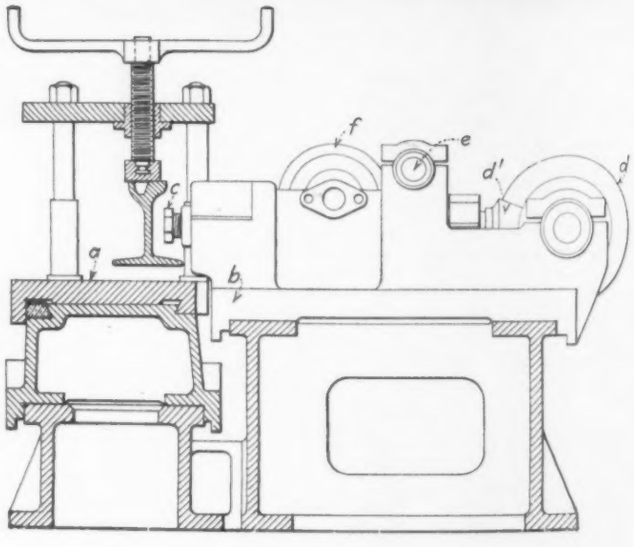
Twelve-Spindle Machine of British Design for Drilling Rail Slots

The Cargo Fleet Iron Co., Middlesbrough, England, which is said to have considerable rail business, is employing the drilling machine illustrated, built by Richardsons, Westgarth & Co., Ltd. The machine is capable of drilling slots in 60 ft. rails, 12 slots at a time, power for all operations being provided by the variable-speed motor mounted at one end, as shown.

It may be observed from the illustrations that there are 12 clamps all of which are capable of sliding along the bed *a*, the flange of the rail being supported between them by a series of idle rollers. The 12 drilling heads are arranged on a separate bed plate marked *b* one of the heads being shown at *c*, the drive to bevels



Machine for Drilling Slots in 60-Ft. Rail, 12 Slots at a Time. The arrangement of the parts is shown in the line sketch at the right. With the rail in position the drills are started and the forward feed engaged. When the drills are through the rail the traversing motion is thrown in, the rail carriages being drawn toward the motor end. This motion cuts the slots



d and *d'* being from the motor through a single reduction gear. From the motor there is a short cross shaft actuated by a back shaft motion and this, by means of dog clutches and bevels, provides a reversing feed for all the drills and also for the rail carriage. Feed shaft *e* which may be seen also at the top of the machine in the front view, geared to the motor, extends its full length and is carried in bearings on the drilling heads. The feed is transmitted to the drill by pinions on the shaft *e* which mesh with gears *f*, a hand operated clamp being provided at each head, while the dog clutch at the driving end provides means of withdrawing the drills.

The second motion transmitted to the rail carriages also consists of bevels and a reversing dog clutch.

The machine is operated as follows: With the necessary adjustments made and the rail clamped in position the drills are started and the forward feed engaged. When the drills are through the rail the traversing motion is thrown in, the rail carriages being all drawn toward the motor end. This motion cuts the slots. When the slotting operation is complete the drills are backed out and the rails run out of the machine endwise.

A new rail being put in, the same operations are repeated, only during slotting the rail travels in a reverse direction, an arrangement intended to effect considerable saving of time.

The machine is capable of cutting slots 6 in. long.

Defects in Phosphor Bronze

A considerable amount of work has been done recently on the metallographic examination of a series of phosphor bronzes submitted to the Bureau of Standards by a manufacturer of this type of material. The specimens failed to cold roll satisfactorily, as they showed pronounced cracks which occurred during the rolling. The examination showed the cause to lie in the presence of oxide within the metal and indicated that the mere addition of phosphor-copper to such a bronze does not give assurance that deoxidation has resulted. Stannic oxide can exist within such an alloy in spite of the addition of phosphorus. The remedy for this condition must be applied in the foundry during the melting operation, that is, the phosphor additions to the alloy must be made before there is any chance for stannic oxide to form.

The Tata Steel & Iron Co. in India is installing at Jamshedpur a 6300-hp. motor, built by the General Electric Co., to be used to drive a combination rail and structural mill which it will operate there. This motor weighs 476,000 lb., has two armatures and one shaft. Its overall length is 25 ft., its width 15 ft., and height 12 ft. 8 in.

Year of Collapse in German Steel Industry

Ruhr Occupation Brought Operations to a Standstill—High Rail Freights Still a Handicap—Items of Progress in Iron and Steel Metallurgy

(Special Correspondence)

[In THE IRON AGE of Jan. 3 conditions in the iron and steel industry in Germany last year were reviewed, chiefly in respect to output, markets, prices and other economic aspects of the situation created by the Ruhr occupation. Another correspondent, whose letter appears below, comments on other phases of the most disastrous year in the history of the German iron industry, paying particular attention to technical developments.]

BERLIN, GERMANY, Dec. 5.—In the year 1923 the whole industrial and economic life of Germany, above all coal and iron, felt the throttling effect of the Ruhr invasion. What is known as the Ruhr district comprises about 1150 sq. m. with about 4,000,000 inhabitants. The Ruhr basin is to be classed with Pennsylvania in the United States and the Cleveland district in England as an important coal and iron producing district, and its significance for Germany appears at once when we know that its pre-war production of coal was 57.8 per cent and that of coke over 71.4 per cent of the total for the old German zollverein. The Ruhr production of pig iron then was 42.5 per cent and of steel 53.3 per cent. Since the loss of the Saar coal and of 77.5 per cent of the coal production in Upper Silesia and the separation of the Lorraine works the Ruhr basin has become still more important for all Germany. Thus after the war the Ruhr coal production became 80 per cent, that of pig iron 76 per cent, and that of raw steel 86 per cent of the country's total. It appears at once that the consumers of coal in Germany are almost completely dependent on the Ruhr basin as the only coal producing district of importance.

What happened in the Ruhr in the French occupation of the past year has been reported from week to week in the daily press. The industries there made utmost endeavors in the early weeks of the past year to maintain operations by consuming the stocks they had on hand; but one after another was forced to stop and in the beginning of the summer almost no pit was producing coal and no iron blast furnace was in operation. In September the population and the Government were at the end of their capacity to make further resistance, and after a nine months struggle came unconditional capitulation, representing the most eventful decision since the Versailles Treaty.

The occupation troops put in operation the railroad service at a very slow rate. Their first endeavors were directed to the transportation of the coal and coke stocks to France and Belgium. About 25 per cent of the lines were in service in early December. The quantities of the removed coal and coke are much less than those furnished by Germany in the year 1922, the confiscated pig iron and steel stores amounting, according to one estimate, to about 600,000 tons, including 200,000 tons of rails. These stocks are now on sale by the French syndicates.

The agreement made on Nov. 25 between the French control commission and the group of Westphalian industries, comprising about 80 per cent of the Ruhr coal production, was closed on very severe terms of payment by these industries, one stipulation being the payment of 10 francs for every ton sold. All stored quantities of coal and iron and steel products remain the property of the allied powers and their transportation is under special conditions.

Only hard necessity compelled the Westphalian industrialists to accept these severe stipulations. They had the choice between acceptance and the danger of bolshevism and open war and riots. Three months have gone since the giving up of passive resistance, and meanwhile the failing support of the Government, the want of employment and the difficulties in procuring the necessary food, added to the general chaos, have increased with every day. The future is exceedingly dark.

Iron Ore Production

In 1922 the iron ore production was 4,368,671 tons in Prussia, about 250,000 tons in Thuringia-Saxony and 460,000 tons in Bavaria and southern Germany. The total in Germany was about 5,080,000 tons, while the imports were 11,013,733 tons.

In 1923 the production of spathic ore in the Siegerland went back to about 1,250,000 tons and of red ores in Nassau to 850,000 tons, while the Peine-Ilsede total is put at 1,300,000 tons, and Thuringia, Saxony and Bavaria have fairly kept up their quantities of 1922. Thus the total iron ore mined in 1923 will not be more than 4½ million tons. Regarding ore imports, the statistics show for the first seven months a decrease from 6,750,000 tons in 1922 to 1,882,000 in 1923. Even in January the unloading of the ore ships in Rhine harbors was brought to a standstill by the military occupation. The ores, most of Swedish origin, which were in transit, were stored in Rotterdam. Swedish mines, which ordinarily give two-thirds of their production to the German blast furnaces, found an outlet for much of their surplus in England, although the mines in central Sweden were forced to reduce production. Also the stocks at Narvik, Lulea and elsewhere considerably increased in the course of the year.

Iron and Steel Outputs Fall off Greatly

Since the blast furnaces in the Ruhr basin furnished in 1922 about 76 per cent of the pig iron produced in Germany and the Ruhr steel works not less than 86 per cent of the steel, it can be seen that for want of coal and ores the outputs of pig iron and all finished steel were seriously cut down in 1923. The few blast furnaces on the coast were able to keep up their activity, but only at high cost for foreign fuel and ore, so that by spring their costs were above selling prices in the world's market. Furnaces in central and southern Germany were in a similar position. In the Siegerland and Nassau production went back to about two-thirds, while Silesian plants maintained their operations. The pig iron output for all of Germany in 1923 may be estimated at 4,500,000 to 5,000,000 tons, as against more than 18,000,000 tons in pre-war times. Steel production for 1923 may be estimated at 5,000,000 to 6,000,000 tons, or probably about half that of 1922.

Foreign Trade

For the first nine months of 1923, imports of iron and steel and their products into Germany were reported at 1,520,000 tons, as against 1,657,000 tons in the same period of 1922. Pig iron imports were 249,000 tons to Sept. 30, this year, against 192,000 tons to the same date in 1922. In scrap the figures are 151,000 tons for 1923 and 437,000 tons for 1922.

Exports of iron and steel for the period January-September, 1923, are put at 1,359,000 tons against 1,889,000 tons in the first nine months of 1922. Machinery exports are given as 230,000 tons for 1923 to Sept. 30, against 339,000 tons for nine months in 1922. The accuracy of all export and import figures for 1923 is questioned in view of the Ruhr occupation.

Coal imports for the nine months of 1923 were 20,311,000 tons and those of coke 1,074,000 tons. The

corresponding figures for 1922 were 7,180,000 tons and 178,000 tons.

Trade with Spain was made difficult by the disputes concerning duties and the fact that France was able to compete successfully for Spanish trade. The Netherlands, which have been good buyers of German iron and steel, are now entering on iron and steel manufacture. It is announced that the Royal Netherlands blast furnaces and steel works will start up two furnaces and 30 coke ovens early in 1924. Competition from Czecho-Slovakia has been more severe in the past year. It is understood that Witkowitz has sent foundry pig iron to Philadelphia.

High Freight Rates

The German railroads had had a notable development since 1880, when they came for the most part into the possession of the state. The service was reliable and cheap, and the net profits were enough to cover a good portion of the general expenses of the Government's budgets. During the four years of war the equipment suffered greatly, and then came the loss of the best part of the rolling stock. Under the socialistic influences and the sudden introduction of the 8-hour day, the number of officials was considerably increased and wages were advanced; general demoralization accompanied by irregularities and thieveries took place. At the end of 1922 the Government had succeeded in reestablishing regular traffic, but the Ruhr occupation brought a great setback. Heavy and increasing losses were shown, and freight rates were advanced to unheard-of figures. As of Oct. 25 freight rates were trebled. The fearful handicap of these advances will be understood from a single example:

The freight on a 15-ton carload of bar iron for a distance of 500 km. (300 miles), which was 280 pre-war marks, is now 1,575,000,000,000 paper marks, which with corresponding valorization means more than six times the pre-war cost. Due to these excessive charges by far the greater part of the old German works will lose their position. If continued, the socialistic Government's freight rate policy will be the death warrant of not a few iron and steel producers.

Iron and Steel Foundries

In 1913 the whole German empire numbered 1574 iron and steel foundries, and their production of castings was 3,344,000 metric tons. The loss by the war was 86 plants, and existing foundries may be estimated at about 1500, but with a production in 1923 of not more than 1½ million tons.

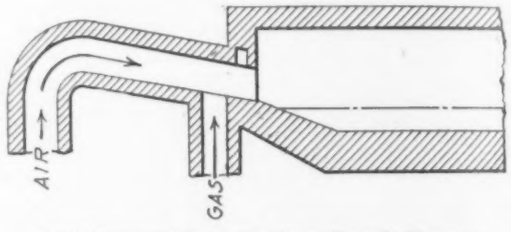
The socialistic tendencies in the Government's laws and regulations have favored the formation of syndicates and even forced producers to enter their respective rings. The German iron founders have been no exception to the general practice of fixing selling prices in meetings and putting them so high that founders who produced at the highest costs could still make a profit. The consumer, especially the machinery manufacturers, have tried on several occasions to obtain reductions, as they were handicapped in meeting the competition of other countries in the machinery trade.

Most of the foundries have now added steel melting and casting departments, as the use of steel is spreading more and more, especially through the automobile industry. It may be said that in 1923 the steel foundries have kept up their production of 1913, while the iron foundries have lost more than half in the same period.

Technical Advance

Technical progress has suffered greatly from the political and economic troubles of the year. Scientific research has been hard hit, and in some directions is in danger of stopping altogether. Literary and scientific men, including students, are practically delivered to hunger and distress by the revolution in the conditions of life. In so critical a situation engineering institutions have contended with serious difficulties in maintaining their work. Their chief effort has been in fuel saving methods. It is understood that the fuel percentage in the cost of iron and steel production is much higher than in the United States. Under the able management of Dr. Rummel, the cooperative fuel-saving movement among German iron and steel works, the so-called "Warmestelle" has made good progress. The methods of measuring have been improved and are now generally employed, and powdered coal firing has also proved successful.

In the Verein Deutscher Eisenhüttenleute Dr. Moll, of Rasselstein, read a paper on an improved end for open-hearth furnaces. The inventor tries to increase the output by intensification of combustion. The temperature, he says, is a function of the time from the ignition to the combustion of the gas. In the open hearth furnace gas and air enter at high temperature, and for quick combustion both need only to be mixed thoroughly. Dr. Moll attains this by introducing the air in the usual way, but the gas enters from below through a vertical conduit, mingling with the air just before the latter reaches the hearth. The ignition thus begins in the air channel and ends about midway of the hearth.



Moll Improved End for Open-Hearth Furnace

Special attention is given to the control and regulation of the quantities of gas and air. The furnaces in the Rasselstein works have a capacity of about 25 tons. They were driven from 6 a.m. Monday to 12 p.m. Saturday and melted 35 or 36 charges. They can be put quickly in operation and melt rapidly. The head, which is carefully water-cooled, lasts about 400 charges and the hearth from 700 to 800.

Electric Cleaning of Gas

From the report given by Dr. Lent, Ruhrort, on a trial plant for electric cleaning of blast furnace gases, it may be stated that the work in this direction has made remarkable progress. While the Lurgi Co. has installed successfully more than 100 plants where the removal of metal, coal, cement or flour dust was required, the cleaning of blast furnace gases involved unexpected difficulties owing to the composition of the dust, its content of water and high temperature. The trial plant at the Rhenish Steel Works, erected in combination with the Siemens-Schuckert works, has a capacity of 3000 cu. m. The degree of cleaning was found to be quite satisfactory, and the cost is put at half that of the usual method of wet cleaning.

A. Wefelscheid has detailed in a technical paper his experiences with the Pfoser-Strack-Stumm process, the object of which is to accelerate the combustion in Cowper stoves. The Stumm works at Neunkirchen rebuilt its whole plant after the new system, equipping six stacks with 13 stoves. As a rule one furnace was served by two stoves and with complete success. The new blast furnaces of the Becker works in Krefeld harbor will have this system and will provide only five stoves instead of the eight stoves which had been planned for the original project. A single stove takes up from 10,000 to 12,000 cu. m. of the gas per hour, while the maximum capacity is the burning of 24,000 cu. m. The temperature is from 710 deg. to 950 deg. C. The improvement consists essentially in filling up the lattice work by special tubes in place of the usual solid fire brick. An experience of more than 18 months shows that the installation is extremely efficient in meeting the varying demands of the blast furnaces, storing the surplus calories in the intervals and altogether working at much less expense than the old system.

Another noteworthy paper dealt with investigations in the working of the so-called abstichgenerator, a gas producer in which the ash residues are melted down

and removed in the form of liquid slag. Dr. Wilhelmi, the author, has secured results which encourage the continuation of the trials. R. Hilterhaus, Duisburg, discussed the automatic cooling beds for thin bar iron, angles, tees, etc., which have been brought out in the past few years and which show improvements.

Next Week's Fabricating Convention in Pittsburgh

For the conference of the steel fabricating trade of the country, to be held on Jan. 23 and 24 at the William Penn Hotel, Pittsburgh, under the auspices of the American Institute of Steel Construction, the following list of speakers has been announced by Charles F. Abbott, executive director of the association, 350 Madison Avenue, New York.

James A. Emery, legislative representative of the National Association of Manufacturers and the National Industrial Council, Washington, who will address the convention at the noon-day luncheon, Jan. 24.

Russell R. Whitman, president *New York Commercial*, New York.

John W. Doty, president Foundation Co., New York, who was in Japan during the earthquake and will present valuable information pertaining to the resistance of structural steel.

Arthur Brisbane, one of the best known editorial writers in America, who will speak on the subject, "The Value of Public Opinion as Related to the Structural Steel Industry."

E. W. McCullough, manager of the fabricated production department of the Chamber of Commerce of the United States, Washington.

George H. Charls, vice-president and general manager United Alloy Steel Corporation, Canton, Ohio.

John G. Jones, vice-president Alexander Hamilton Institute, New York.

H. J. Kenner, president Better Business Bureau of New York City, who will discuss trade practices and codes of ethics as applied to various industries.

Walter Drew, counsel National Erectors' Association, New York.

Fred F. Moran, managing director Apprenticeship Commission of the New York Building Congress, New York.

Dr. Julius Klein, director of the bureau of foreign and domestic commerce, Department of Commerce, Washington, may also attend.

An invitation has also been extended to an official of a prominent Canadian fabricating company, who would present information of interest to all fabricators. A special speaker, connected with one of our largest corporations, has been selected to review the benefits that can be derived through educational publicity.

Lee H. Miller, chief engineer of the institute, will make a detailed report in regard to the adoption of the association's standard specification. The proposed program to control the future activities of the institute will be presented by Mr. Abbott, the executive director. The committee on standard practice will submit a report as will the traffic committee and the publicity committee.

An invitation is extended to those interested, whether they are members of the institute or not, and the representatives of the steel mills are invited to participate in the discussions.

Shipbuilding Decreases in America

Shipbuilding decreased in the United States in the final quarter of 1923, although it increased in Great Britain and Ireland, according to a report issued by Lloyd's Register of Shipping. In comparison with the third quarter of 1923 British shipyards had 123,000 gross tons more of orders on their books, while American yards had 7000 tons less, and the other countries combined 50,000 less. Practically all maritime nations excepting Great Britain and Ireland showed a loss.

The Inland Steel Co. expects to place in operation by Feb. 1 two of the four 100-ton open-hearth furnaces which it is now constructing at its Indiana Harbor, Ind., plant. The Inland company is now operating the Milwaukee Rolling Mill Co. sheet mill at Milwaukee, which it recently purchased.

James Hartness Elected President of Engineering Council

James Hartness, president Jones & Lamson Machine Co., Springfield, Vt., former Governor of Vermont, and past president of the American Society of Mechanical Engineers, was elected president of the American Engineering Council to succeed Dean Mortimer E. Cooley, University of Michigan, at the annual meeting of the Council in Washington, Jan. 10 and 11.

Vice-presidents elected were L. P. Alford, New York, and Charles R. Gow, Boston. Other vice-presidents are Calvert Townley, New York, and Gardner S. Williams, Ann Arbor, Mich. Dr. H. E. Howe, Washington, continues as treasurer, and L. W. Wallace, Washington, as executive secretary.

A feature of the meeting was the national public works conference held Jan. 9, at which resolutions favoring a reorganization of Federal departments were adopted. It was voted to again set in motion the nationwide movement for the establishment of a department of public works, the movement to be directed by the council from its headquarters in Washington. In association with the Engineering Council, an advisory council composed of one representative from each participating organization will function.

At the annual dinner of the Council, held Jan. 10, at the Chevy Chase Club, Secretary Hoover, President Nicholas Murray Butler of Columbia University, Assistant Secretary Dwight F. Davis of the War Department, President Hartness of the council, and the Italian Ambassador, Don Gelasio Benedetto Anatolio Caetani, were speakers.

The Great Lakes-St. Lawrence River project was discussed at the business sessions of the Council, the following resolution being adopted: "That it is the sense of the American Engineering Council, in view of the magnitude of the project for improving the St. Lawrence waterway and the great amount of public interest that has been manifested in it, that a full and complete engineering investigation of the project, participated in by civilian engineers of both Governments affected, should be made to determine the facts with respect to navigation, power, alternate routes and any other relative matters which may be involved."

The committee on storage of coal reported informally that the complete findings of the committee would be made public next month.

Following the meeting President Hartness held conferences with officers and members of the council at which an active program for 1924 was mapped out. Foremost among the council's activities will be the direction of the public works enterprise and the development of closer contacts with the member societies.

Hearing of Jones & Laughlin Steel Corporation Complaint Ended

PITTSBURGH, Jan. 14.—Hearing before William A. Disque, examiner Interstate Commerce Commission, in the complaint of the Jones & Laughlin Steel Corporation against rates on iron and steel products out of Indiana and Illinois mills to points within those States and to St. Louis was concluded last week and Feb. 18, has been set as the date for the filing of arguments in the case at Washington. The complainant seeks to have rates out of Pittsburgh on finished steel products placed upon an equitable basis in relation with those from Middle Western mills. It is believed that six months will elapse before there is a decision in the case, because the Illinois rates were made by the State railroad board and there is some question of the authority of the Interstate Commerce Commission on intrastate rates.

GERMAN STEEL PRICES HIGHER

Bars Marked Up 5 Gold Marks—Thin Sheets 50 Per Cent Above Bars

(By Radiogram)

BERLIN, GERMANY, Jan. 14.—Steel bars are now quoted at 150 gold marks per metric ton (1.62c. per lb.) and thin steel sheets at 225 gold marks (2.43c.).

[Two weeks ago (page 132, THE IRON AGE, Jan. 3) steel bars were quoted at 145 gold marks (1.57c. per lb.). The pre-war figure on bars was 98m. (1.06c. per lb.).]

GERMAN PRICES FALLING

Increase in Unemployment Less Rapid—Ruhr Resumption Slow—Ruhr Offices Transferred to Berlin

BERLIN, GERMANY, Dec. 29.—The price decline in coal, iron, steel and similar products caused by the introduction of the rentenmark has made further progress. The Federal wholesale index, now expressed in gold marks, and based on 100 in 1913, showed 120 for Dec. 27 against the maximum of 139 reached in late November. Gold prices are again below the world-market. Standard Ruhr coal, which reached 38.46 gold marks per metric ton on Sept. 24, fell on Dec. 19 to 20.60; and a further reduction of 10 per cent is effective Jan 2. This reduction applies only to unoccupied territory. A contributing factor to the reduction is the prolongation of the working day in subsurface mining to 8 hr. with a 10-hr day for surface workers.

Prices of Pig Iron and Steel

Prices for the products formerly controlled by the Steel Syndicate are reduced 20 to 25 per cent when payment is made in a good foreign exchange, and about 15 per cent when payment is made in a stable German currency (the rentenmark). The last "guiding price" for bars established by the Steel Syndicate was 191 gm. ($45.45) per metric ton; the present free market price is 145 gm. ($34.50). German prices are about at world-market level, but are lower than quotations of eastern European sellers. The Upper Silesian works now controlled by Poland will not deliver rolled material under £9 to £10 per ton ($38 to $42); and Czech bars cost, c.i.f. Oderberg, 110 crowns per 100 kg. ($33 per metric ton), to which must be added the German import duty and freight to the interior of Germany. As a result Czech iron can no longer compete in Germany.

The price fixed by the Pig-Iron Syndicate for hematite and No. 1 and No. 3 foundry iron is 116 gm. ($27.60). At this price German pig iron can about compete with Luxemburg iron, which is being widely offered. A comparison of 1914 and 1923 gold mark prices shows No. 3 foundry at 70½ gm. in 1914 and 116 gm. in Dec. 1923. Bars were 97 to 99 gm. in 1924, compared with 145 gm. in Dec. 1923.

The Association of Iron-Founders has reduced by 20 per cent the gold mark prices fixed on Sept. 1. Tubes, axles, and many other iron and steel products have been reduced. As there is practically no such thing as a real gold mark in Germany, "gold mark prices" are actually in units of rentenmarks or trillions of paper marks. Whether the present relative price-stability in "gold marks" is to be maintained will depend upon whether the rentenmark and paper mark have really been stabilized.

The Steel Syndicate is finally ended. The provisional agreement for creating a coal pricing and distributing syndicate to replace the Rhenish-Westphalian Coal Syndicate failed, and the Government by decree prolonged the latter until Jan. 15. The Pig-Iron Syndicate's existence was reported threatened by the secession of one important member, the Rhenish Steelworks Co.; but it is stated that the Syndicate will continue. The Deutsch-Luxemburg, Gelsenkirchen and Bochum corporations, all members of Stinnes' Rhine-Elbe Union, have removed their main offices to Berlin. This change is part of a general reorganization of the Stinnes' interest aimed at separating mines and workshops in occupied territory from those in unoccupied.

Slow Resumption in the Ruhr

While coal-mining is being rapidly resumed in occupied territory, the renewal of smelting and rolling-mill operations proceeds slowly, transport troubles and shortage of ore, fuel and working capital contributing to delay. The Phoenix, Hoesch, Rhenish Steel and Bochum corporations all announce gradual resumption of work. Labor difficulties are feared. The Rhenish Metal Wares Corporation of Dusseldorf has discharged all its workmen, claiming that production is not profitable at present wages. The drop in the cost of living during the past month by about 30 per cent has not led to a decline in wages. Against this, however, is the fact that the order prolonging maximum working hours in safe and hygienic industries to a 10-hr. day has been issued, resulting in numerous 10-hr. agreements with workmen, including those in the Upper Silesian metal industry.

The last reports from Solingen, Hagen and other centres of special steel and small hardware manufacture are unfavorable but the rate of increase in unemployment has everywhere slightly slackened.

The number of fully unemployed in all Germany on Dec. 25 was estimated at 3,450,000, of whom 2,000,000 were in occupied territory. In the iron and steel industry on Dec. 1, 24 per cent of labor union members were fully unemployed, compared with 1.29 per cent in January, 1923; part time workers were 49.7 per cent against 2.04 per cent in January, 1923.

Stagnation in Buying

This stagnation is for the first time accompanied by a surplus of certain kinds of iron products and competitive price-cutting. Dealers with large stocks, fearing difficulty in selling, are quoting below the reduced prices of producers. So far no iron or steel from the Ruhr has reached unoccupied territory, which has prevented a greater price decline but the demand for steel, as a result of continued suspension of building operations, is small. There is, however, a shortage of heavy sheets. Medium and thin sheets are offered in abundance. Ultimately the supplying of unoccupied Germany with metal from the Ruhr must be resumed.

Smelters in unoccupied territory are at present obtaining coke from England and ore from Sweden and there is no sign of failure of the supply. Since the mark stabilization, the Reichsbank has been able to satisfy 100 per cent of the importers' demand for most foreign currencies, exceptions being the dollar and pound sterling, but the supply of these has increased. Some producers in occupied territory expect to have difficulty in selling. Bremen shipyards, having rejected an offer of 25,000 tons of structural steel from the Cologne Otto Wolff concern, on the ground that Wolff refused credit, are negotiating for the purchase on credit of English steel. The scrap iron market has of late been dead, owing to the stagnation in the chief consuming district, the Ruhr. Scrap traders have been trying to increase their export against official obstacles.

The foreign trade balance in October, the last month reported, showed a slight improvement. No values are given, but whereas imports as compared with September fell from 3,419,800 metric tons to 2,914,900 tons, exports increased from 1,142,600 tons to 1,183,300 tons.

Luxemburg Market

LUXEMBURG, Dec. 28.—Depression continues and buyers still hesitate at placing business under present conditions. Improvement in the coke market and sizable purchases made in England, have enabled several furnaces to blow in lately. This increase in coke supplies is expected to partly offset the declines in prices which may be accentuated by the return of Germany to export markets. It is presumed that the renewal of activity in Germany and the liquidation of Ruhr stocks will create a period of depression, lasting three to four weeks followed by important price concessions. It is

noteworthy that Germany is reported to have definitely abandoned limitation of working hours; most of the plants are now operating on a 10-hr. day and some of the Krupp plants have resumed with alternative crews twice a day, even in the departments where work is continuous.

This situation it is expected will place the German plants in a superior position for export business, so that future prospects for Luxemburg trade are far from favorable.

With the dissolution of the Belgian coke syndicate, Luxemburg plants have placed sizable orders with Belgian coke-ovens, at prices ranging below the cost of the British product.

Luxemburg plants have shown less activity in offers at Antwerp. Cast iron No. 3 is quoted at 420 to 425 fr. per metric ton, f.o.b. Antwerp. Semi-finished products are quiet, with quotations as follows:

	Fr. Per Metric Ton
Ingots	500 to 510
Blooms	535 to 540
Billets	535 to 540
Largets	580 to 590

In finished material, prices are high and the market dull. Quotations, f.o.b. Antwerp are 640 fr. for beams.

In November, 1923, production of pig iron from 31 active blast furnaces was 137,893 metric tons, largely basic Bessemer. Steel ingot production totaled 121,613 metric tons.

FRENCH MARKET UNSETTLED

Depreciated Franc Aids Export but Not Purchases of Raw Material—Luxemburg Depressed

PARIS, FRANCE, Dec. 28.—While there has not been the revival of activity that was expected, markets are steadier as a consequence of the pressure of exchange. Buyers and producers are still holding back so that demand is quiet and prices the principal factor. If, during the year, consumption does not grow proportionately to the increase in production, which is expected to reach a high level, there will undoubtedly be a period of keen competition between producers, bringing on ruinous price concessions.

With the holidays over business is expected to continue quiet for one or two weeks. The French market has, during the past week, been quite unsettled by the further depreciation of the franc. Although this aids in the larger development of foreign trade, importation of raw materials, principally coal, is burdened that much more.

Discussions were recently renewed between French and German iron and steel makers toward the possible exchange of iron ore for coke. No agreement could be made, however, because of disagreement as to price. Germans are not interested in delivering coke to France in addition to the tonnages required by the treaty. The new German coke price is not established yet.

Coke.—Reparation fuel has weakened during the last few days, probably as a result of the holiday suspensions. The total receipts for the 26 days of the month were 212,272 tons, or a daily average of 8164 metric tons. The January price is unchanged at 220 fr.

Iron Ore.—Production and consumption are increasing and stocks are slightly lower. The various ores are quoted as follows: Briey, 16 fr.; Longwy, 12 fr.; Nancy, 10 to 13 fr.; Thionville, 12.50 fr.; Normandy, 50 per cent 35 fr. f.o.b. Caen; Brittany, 50 per cent 35 fr. f.o.b. Nantes or Saint-Nazaire; Pyrenees, 30 to 32 fr.

Pig Iron.—The market is quiet, but better sustained. Available supplies are larger as some furnaces in Lorraine and the East have been blown in. Domestic prices are 385 to 395 fr., at works, for No. 3 chill-cast foundry. Longwy high grades are 5 to 10 fr. more. Hematite has improved, as no dealings are actually possible in British brands which prices work out to 540 to 560 fr. Hematite is quoted at 415 to 425 fr. at works and 450 to 460 fr., delivered, for ordinary qualities. Offers from Lorraine and Luxemburg plants for export are not numerous, as furnaces are well booked ahead. Ruling prices are 420 to 425 Belgian francs, f.o.b. Antwerp.

Semi-Finished Material.—There is a weaker tendency as a result of the announcement of the liquidation on the home market of 32,000 tons of Ruhr semi-finished steel. Lorraine works are seeking orders for export. Prices are weaker to meet competition. The following are quotations per metric ton, f.o.b. Antwerp:

	Fr.		Fr.
Ingots	500 to 510	Billets	560 to 565
Blooms	535 to 540	Largets	580 to 590

Finished Material.—Rail makers are now booked for several weeks with various orders received from the railroads at 510 to 530 fr., at works. Inland demand for beams is not strong, but some large orders are being booked for export. Mills on the whole are well filled for January and are in most cases seeking business for March and April. Merchant iron bars are steady with an increase of 3 fr. per 100 kg. Inland quotations range from 55 to 57 fr., merchant grades, 57 to 64 fr. per kg., according to size of orders. For export, Lorraine mills are asking 625 to 630 fr. per metric ton for beams, 660 to 670 fr. for merchant grades.

Sheets.—Slight activity is noted in large flats and the heavier gages, with prices steadier. Heavy sheets are quoted at 65 to 68 fr. per 100 kg. Light and medium gages are offered in the North, East and Lorraine.

Fair export activity is reported from Lorraine plants, and German sellers are forced to make concessions to secure business. The following are the usual quotations, per metric ton, f.o.b. Antwerp, for basic sheets:

	Fr.		Fr.
5 mm.	725 to 735	1 mm.	1,050 to 1,100
3 mm.	780 to 800	0.5 mm.	1,250 to 1,275
2 mm.	825 to 835	5 mm., open hearth	740 to 750
1.5 mm.	900 to 925		

Steel Corporation's Orders Increase

The final 1923 tonnage statement of the United States Steel Corporation showed 4,445,339 tons of unfilled orders on the books as of Dec. 31, or 76,755 tons more than remained unfilled Nov. 30. This increase is the first one reported since March, 1923. In November unfilled business fell off 304,241 tons, in October 363,925 tons, in September 378,913 tons, in August 496,100 tons, in July 475,498 tons, in June 595,090 tons, in May 307,158 tons, and in April 114,823 tons, while in March it increased 119,343 tons, in February 373,213 tons, and in January 165,073 tons. On Dec. 31, 1922, the unfilled tonnage aggregated 6,745,703 tons, or 2,300,364 tons more than on Dec. 31, last. Following is the unfilled tonnage as reported by months since January, 1920:

		1923	1922	1921	1920
Jan.	31	6,910,776	4,241,678	7,573,164	9,285,441
Feb.	28	7,283,989	4,141,069	6,933,867	9,502,081
March	31	7,405,332	4,494,148	6,284,765	9,892,075
April	30	7,288,509	5,096,913	5,845,224	10,359,747
May	31	6,981,351	5,254,228	5,482,487	10,940,465
June	30	6,386,261	5,635,531	5,117,868	10,978,817
July	31	5,910,763	5,776,161	4,830,324	11,118,468
Aug.	31	5,414,663	5,950,105	4,531,926	10,805,038
Sept.	30	5,035,750	6,691,607	4,560,670	10,374,804
Oct.	31	4,672,825	6,902,287	4,286,829	9,836,852
Nov.	30	4,368,584	6,840,242	4,250,542	9,021,481
Dec.	31	4,445,339	6,745,703	4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, at 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

To Build Six Standard Oil Barges

The Bethlehem Shipbuilding Corporation, Ltd., will build at its Sparrow's Point Plant six steel barges for the Standard Oil Co. of New Jersey. The barges are to be used in Ohio River service. Three will be towed to the Ohio River from the Sparrow's Point Plant on April 2 and three on May 2. The barges will be taken down the Atlantic Coast and up the Mississippi and Ohio Rivers, a distance of about 6000 miles. They will be propelled by fuel oil engines and will carry 2000 bbl. of fuel oil in bulk with a deadweight of about 290 gross tons.

EXPORT MARKETS QUIET

China Inquires for Structural Steel—Japanese Reconstruction Board Abandoned

NEW YORK, Jan. 15.—Export business continues quiet, with practically no activity in Japanese trade and only a few inquiries from Chinese markets. Among current inquiries from China are requests for quotations on small tonnages of structural steel and a light demand for tin plate wasters. Japanese inquiry is extremely quiet, business still being somewhat affected by the usual holiday dullness.

But little reconstruction activity is expected in Japan for many weeks, probably not until after March 1, or later. The Metropolitan Reconstruction Board, formed to handle all phases of the reconstruction problem, will automatically cease to function about the end of February, as, by that time, its funds will have been exhausted. The recent appropriation of several hundred million yen by the Diet as a reconstruction budget is not available for the reconstruction board and will be administered, according to reports, by some government department, probably the department of home affairs. In the meantime, no further government purchases of reconstruction material are being made, material purchased by merchants and others following the earthquake is now beginning to arrive and for the present sufficient stocks are on hand.

The South Manchuria Railway Co., which has not yet awarded the tender on slightly less than 300 tons of railroad spikes, is reported to have purchased the material for assembling four locomotives in its own shops from the American Locomotive Co.

A number of foreign construction projects are reported in prospect for this year. Colombia has appropriated $800,000 for the construction of the Puerto Wilches Railroad and during the present month work is to be instituted on the Tumaco-Ipiales-Pasto Railway, for which a minimum of $600,000 has been appropriated From China, it is reported by the United States Department of Commerce that the Hai Ho Conservancy Commission, Tsientsin, is asking for bids on a bascule bridge across the Hai Ho River, abutments 306 ft. apart, bridge 50 ft. wide. No statement is made as to the method of financing. Final contracts for construction work at the Port of Naples, Italy, has been made, Viceconsul Julian C. Dorr, Naples, reports, and it is noteworthy that the largest contract, $3,000,000 of a total expenditure of $8,400,000, was awarded to an American company.

BELGIAN MARKET WEAK

German Competition Felt—Export Slack—Coke Syndicate Dissolved

ANTWERP, BELGIUM, Dec. 21.—The general impression is that the market will continue to decline. Business is quiet and on certain products important price reductions have been made. Bars are quoted at 680 fr. by Belgian works. French competition continues strong and German offers are again beginning to appear, such as 650 fr., f.o.b. Antwerp, for bars. This price is slightly less than $30 per metric ton, compared with the Belgian price of $31.20 per ton. Quotations from French works are about 670 fr., or about 45c. per ton lower than the Belgian price. It is expected that Belgian mills will be found to make concessions, especially as buyers are withholding orders in expectation of a reduction. The same unstable condition prevails on beams. Some business has been transacted for export at prices as low as 620 fr. or $28.45 for heavy material, contrasted with a nominal domestic quotation of 630 fr., a concession for export of 45c.

This same unfavorable difference in prices exists in the sheet market. Heavy basic Bessemer sheets have been offered for export at 750 fr., or $34.40, while the domestic price was still 780 fr., about $1.40 difference. These lower export prices have been specially quoted in order to meet the new German offers, and without doubt a general reduction of prices will occur before long in the domestic market.

The situation in wire nails and wire is not particularly favorable, and a reduction of $2 to $2.50 per ton is generally expected. Belgian billets are still scarce. Only a few works have small quantities to offer and their prices are high. Nominal quotations are 560 fr., or about $25.60. Commercial iron is holding fairly firm. Makers are well supplied with tonnage taken on during the period of high prices and deliveries now being offered are rather delayed. Prices as high as 750 fr. for No. 3 iron, or $34 per ton, are still being quoted.

High phosphorus pig iron has been reduced. For 2.50 to 3 per cent sil. the ruling price is about 425 fr., delivered consumer's works, or $19.50. Quantities offered from Lorraine are smaller now than they have been, but prices are equivalent to Belgian quotations. Luxemburg works quote lower prices. Early delivery is easily obtainable, but there is little business reported for export. Domestic demand is normal and stocks quite sufficient. Export business with England, and especially Scotland, may revive before long, as the increase of prices by Scotch makers for all grades foundry pig iron may render Continental prices more favorable, particularly if the exchange continues as high as it is now. The production in Belgium during November was 205,120 tons of pig iron with 40 furnaces.

Coal prices are somewhat weak. The coke market, on the contrary, is more active. The Coke Syndicate has dissolved. This concern, which for many years controlled the sale of nearly the entire production of Belgian coke, ceased to function on Jan. 1, each maker being free to dispose of his production at his own prices. It is reported that domestic and export contracts have been made for delivery in Luxemburg at prices as high as 200 fr., or $9.18, and higher, compared with the average price of the Syndicate for December of 194 fr. for the same quality.

Current iron and steel quotations in francs per metric ton, for domestic delivery, are as follows:

Commercial iron No. 2	720	$33.00
Commercial iron No. 3	750	34.40
Commercial iron No. 4	800	36.70
Heavy sheets, Bessemer	725	33.25
Thin sheets, Bessemer	1,100	50.45
0.5 mm. sheets, Bessemer	1,250	57.35
Heavy sheets, open-hearth	750	34.40
Galvanized sheets, 1 mm	1,900	87.50
Iron bars, base	680	31.20
Angles, base	675	30.90
Rails	725	33.25
Beams, base	630	28.90
Rods	850	39.00
Ingots, Bessemer	500	22.90
Blooms, Bessemer	540	24.75
Billets, Bessemer	560	25.70
Open-hearth steel, ordinary	700	32.10
Open-hearth steel, half hard	850	39.00
Spring steel	1,250	57.35
Galvanized wire	1,450	66.50
Barbed wire	1,500	68.80
Wire nails, base	1,250	57.35

Pittsburgh Base Hearing

WASHINGTON, Jan. 15.—It was announced yesterday at the offices of the Federal Trade Commission that the United States Steel Corporation on Feb. 15 will present sur-rebuttal evidence in the Pittsburgh base case. Present indications are that the hearing will be held in Washington.

Final disposal of the Pittsburgh base case has taken on increased interest by reason of the resignation of Victor Murdock as a member of the commission. Mr. Murdock and Nelson B. Gaskill are the only present members of the commission who voted against the issuance of a complaint in this proceeding. One other member, Vernon W. VanFleet, took office after the case was under way. There are five members of the commission and its action in issuing or refusing to issue complaint is based on a majority vote. The resignation of Mr. Murdock is effective Feb. 1. It was announced that Mr. Murdock resigned in order to return to newspaper work. He is interested in and was former editor of the Wichita *Eagle*, Wichita, Kan., with which he will resume his association.

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A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

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Delusions About Competition

THERE is a common opinion that we are living in an age of competition and that competition means rivalry in selling prices. If we deny nowadays that "competition is the life of trade," the denial is not publicly registered, and the fact recognized by some men that the real competition may be in quality and service is not popularly and generally adopted as a principle of faith and conduct.

Times have changed with the growth of the factory system, and we have not modified our beliefs or accepted notions as these changes should dictate we should. By the change in our methods of production the proportion of total cost that is paid out in wages has decreased and the proportion due to use of capital and obsolescence of equipment has increased enormously.

Of the production cost of an article nowadays a large part is expense which would continue if the article were not produced. In common parlance, "The overhead goes on." When these notions about "competition" were first formed, conditions were quite different.

The competition represented by our popular and faulty notion would mean that a factory would endeavor to run full and offer its goods at lower and lower prices until it reached the point where it could not obtain cost less overhead. At stages, of course, it would reduce wages, and finally it would lay off all its workmen. The industry would languish and, by depreciation of equipment, productive capacity would decrease. When demand revived there would be less capacity than before, when by reason of the growth of the country there ought to be more capacity.

To attempt to run the business of the country in that way would be absurd and ridiculous. The bolshevists in Russia would appear by comparison highly enlightened and farseeing. Yet many people think that is what we are doing.

When a discovery is made that a producer, in endeavoring to preserve his business, is having recourse to anything but price rivalry with his competitors, there is consternation in some quarters. The producer is breaking what is considered in fancy a law, a law of trade. Yet in plain fact the most marvelous and admirable achievement of modern business is its success in refusing to sell at cost less overhead, as the popular notion would require it to do much of the time.

It is good not alone for the producer that he preserve his business. It is good also for society. There may be a restraint, a curbing, of trade by factories rusting and rotting away. To preserve their business, producers need information of various kinds. One kind is statistical information from day to day or month to month as to the production and consumption of the commodity involved. There is something wrong somewhere when the Department of Justice of the United States is moved, as it now is, to question the propriety of such statistical information being secured and used. To insist that the interest of a mythical class of "consumers," as distinguished from producers, demands that industry be blindfolded and hog-tied, so that it may stumble and blunder into losses, is quite on a par with making a virtue of hari-kari.

Unexpected Results of Three Shifts

REFERRING to the article published in THE IRON AGE of Jan. 3 on the abolition of the 12-hour day at iron and steel works, R. H. Sweetser, Columbus, president of the Southern Ohio Pig Iron and Coke Association, writes:

> In all the discussions and publications on the three-shift day, I have seen nothing about two results that have appeared to me:
>
> First: There has probably been no problem in blast furnace practice that has had so much attention from able, earnest men as has this three-shift day. The problem is going to be solved, and much good will come from it, *but all the benefits that follow its adoption should not be credited to the three-shift day itself,* except indirectly. So much attention has been focused on the customs of blast furnace practice that there will be a general elimination of wasteful methods and of all wasteful idleness.
>
> Second: The effect of the three-shift day on rates of industrial compensation insurance is to penalize those employers who have gone from a two-shift day to a three-shift day. The hourly rate of wages has been increased 25 per cent or more, and the individual length of exposure to injury has been reduced by one-third.

The statement of Mr. Sweetser illustrates what is so often true when an important change in in-

dustrial, social or political relations takes place —that the results are likely to be very different from those which had been expected, sometimes being disappointing and sometimes more satisfactory than the proponents had dared hope for.

As to the two results referred to by Mr. Sweetser, the second is of minor importance. The Ohio State compensation law provides that the premium paid shall be based on a certain percentage of the total payroll, and on account of this fact an injustice is done to the companies which have adopted the eight-hour shift. But the injustice is so manifest that it seems safe to assume that the Industrial Commission and the Legislature will see that the present plan is amended.

As to the other result mentioned—the improvement of blast furnace practice with elimination of wasteful methods and all wasteful idleness—there is every reason for congratulation. It is related that one man who obtained employment in the Pittsburgh district soon after the eight-hour shift was introduced proceeded to take a nap; and when the superintendent protested the man said he understood this was the privilege of the blast furnace worker—that he was entitled to three hours' sleep out of twelve hours on duty. When informed that things had changed and that the men were actually working when on duty, the man refused to go on with the job. The elimination of such idlers would help to make possible the improvement to which Mr. Sweetser refers.

It is this very intensive study of every feature of blast furnace operation on the labor side, as mentioned above, that has made the increase in production cost of pig iron at some plants making the change so much less than experienced managers predicted.

American Zinc, Lead and Copper in England

BRITISH demand last year for some of the products of American non-ferrous metal refineries and rolling mills calls for comment. Purchases of zinc, lead and copper were large and exerted an influence on the trend of American markets. Most striking was the demand for zinc. To Dec. 1 Great Britain had taken about 78 per cent of our zinc exports, much of the metal going into the rapidly increasing output of galvanized sheets. British demand for American lead had reached by Dec. 1 nearly 41 per cent of our total exports. In zinc and lead Great Britain was the largest buyer from the United States.

Of American refined copper, shipments to Great Britain were exceeded only by those to France and Germany, the British purchases for eleven months having been over 19 per cent of the total. In copper rods Great Britain ranked first, taking over 44.5 per cent of our total exports.

These movements are, perhaps, more significant of a gradual revival of British industry than transactions in steel. The non-ferrous metals enter into many channels of every-day consumption and reflect activity in industries affecting many people. This consumption, moreover, has been accompanied by a distinct expansion in the use of certain forms of steel and iron. More than in many years have developments in British markets affected American prices of zinc, lead and copper.

On the Way to Tax Reduction

MORE than five years have passed since the armistice, but we are paying income taxes at the war rate. The Secretary of the Treasury has declared that our national finances now permit a large reduction of taxes and has presented to Congress a scientifically drawn bill to bring that about. The popular reaction to this has been enthusiastic. Who is there earning an income of $2,000 per annum, who wants to pay $40 per annum when $22.50 is all that is necessary? Or who is there earning $5,000, who wants to give the Government $160 out of it, when the leading fiscal officer says that only $90 is needful? Or who that can make such a saving out of what he earns wants to forego it in order to hand it over to some one who did not earn it? With a program so simple and desirable there is no good reason why Congress should not consummate it in a week or two. Of course, there are plenty of bad reasons why either it should not be done or should be bedeviled in the doing because it has to be done out of deference to popular demand.

A situation like the present, wherein we see the representatives of the people reluctant to act for the plain interest of their constituents and see the people constrained by clumsy methods to compel them to do so, is a satire upon popular government. The people of the country would do well to profit by this lesson and turn out the stumbling blocks at the next election. There is at present one simple formula, namely, enact the Mellon bill and do it quickly. We have a notion that most of the politicians who are trying to evade that are writing their political death warrants.

There is no doubt whatever that Congress will make some tax reduction. The only question is as to how much it may bemuddle the well-conceived Mellon program. This may take the form of a reduction upon small incomes only, even letting them go scot free; no reduction of surtaxes; a restoration of excess profit taxes; or a combination of all these evils. There may be also an increase of inheritance taxes.

Thoughts of such nature are quite different from what they were during the war, when the inspiration was national safety and the exaction of sacrifices to insure it. Now the inspiration is purely political and sociological. The conception is for a process of economic leveling. The idea respecting excess profits during the war was that business should surrender to the State the increment above normal which was attributable to the war. The present idea is that any business that is administered so successfully as to yield more than a limited return upon its investment should be penalized. Similarly, those persons should be penalized who earn large income or derive it from investment of past earnings. If these things be insufficient as levelers, another slice may be taken as inheritance tax.

According to socialistic economists such a

program is characterized as taxation according to ability to pay. The workers have no ability to pay, they argue, wherefore the whole burden should fall upon the professional and business classes and the well-to-do. They see the point that by such a system there would be not enough left for capital savings. They appreciate that a growing population needs increasing means of transportation, manufacturing, housing, etc., but say fatuously that the state would attend to that out of the proceeds of taxation, disregardful of the multiplication of evidence that every State that has tried to conduct business has made a mess of it, and of the philosophical reasons why that is bound to be so. They are mindless, moreover, that in curtailing the incentive to produce large income they tend to dry it up altogether.

The so-called radicals from the agrarian States who are opposing Secretary Mellon's plan presumably express ideas that are entertained by their constituents or that they think will be agreeable to them. Now, the farmers of Wisconsin and Minnesota, who are capitalists in that they are owners of property, would be as resentful of having their property nationalized as were the peasants of Russia. It may be that they are unconscious that socialistic principles are being foisted upon them. It may be that they are complacent respecting the confiscation of the property of others, just as were the Russian farmers.

If Congress in bedeviling the plan of Secretary Mellon should go further in concentrating taxation upon a small class of citizens and letting the millions go free, it will do much to convert this country from a democracy into a tyranny. Secretary Mellon has tried to be fair and in being so has shown himself to be one of the best democrats we have. In drafting this tax reduction he has leaned in generosity to the side of the smaller taxpayers. On sound economic grounds he might have advocated larger reductions of surtaxes and better means of collecting something from the millions who do not now pay any Federal income taxes at all.

WITH American production of finished rolled iron and steel making a new record in 1923 (though the ingot total was less than in 1917), exports last year were relatively the smallest in many years. In an analysis of the relation of exports of rolled steel to the production, published in THE IRON AGE of Jan. 3, it was shown that since the war the trend has been decidedly downward and that the 1923 percentage was probably less than the lowest since 1910. In that year exports of finished iron and steel were 6.1 per cent of the output and in 1913 they were 9 per cent. The maximum was reached during the war at 16.9 per cent in 1917. After the war, when American steel was still in demand because other nations were unable to compete, the high percentage was 15.4 in 1919. There has been a decline ever since, 1922 showing only 6.9 per cent, while 5.2 was the figure for 1923 up to Oct. 1. The year's complete returns are not likely to increase this above 5.75 to 6 per cent. Foreign demand for the products of American steel mills has fallen below the unimpressive percentage of 13 years ago because of the world's curtailed ability to buy and because of the competitive advantage other steel-producing countries have had through the steady depreciation of their currencies.

Income and Efficiency

THE wide circulation lately of statements that wages have greater buying power than ever before represents, no doubt, efforts to encourage workmen to be well satisfied with their wages. The mere comparison of wage rates in dollars at one time or another means little because the buying power of the dollar has varied. It has been well established that while wage rates in the past year have been very high the quantity of goods and service that can be purchased with a week's wages is higher than ever before. The relation between wages and the cost of living is favorable to the worker.

It is good that workmen should be content, as that promotes smooth operation of the country's industrial machine; but we ought to know more. Whence comes this increased buying power of a week's wages? Is there merely a redistribution of the income of the country, or are the individual workmen accomplishing more, being thus entitled to more on account of service rendered, or is there an increase in efficiency in producing goods and rendering service whereby every one should receive more?

As to redistribution, we should know quite well by this time that an allocation of a supernormal percentage of the total income to the payment of wages and salaries and a subnormal percentage to capital and management will not be conducive to economic progress. Various researches, and particularly those of two years ago by the National Bureau of Economic Research, have shown that in the past poor times and little progress have been accompanied by a high percentage to wages and salaries, though the sum would be low by total income being low, while in progressive times there is a higher percentage to capital and management, with a larger income all around.

While there has been much expressing of opinion, it is doubtful if there has been much careful study to determine how efficient the workman has been, say in 1913, 1920 and 1923, on the basis of his having in each year precisely the same tools, appliances and materials.

Without any redistribution, and with the workman personally neither more nor less efficient, a week's wages may come to buy more in goods and service by there being improvements in implements and methods. It would be very advantageous if progress of this sort could be measured and expressed in simple terms. It is such progress that is of greatest and most lasting benefit economically. Once an improved tool or method is provided a permanent step forward is taken. Men will never go back to the poorer tool or method. Workmen may become assiduous and painstaking in a period of industrial depression, only to become lazier and more careless than ever

when they find things are coming their way again. Labor may get an increased and undue proportion of the total income for a time, only to find that industrial development has been discouraged, making it hard later on to get a job.

When it is decided that a week's work obtains more goods and service than ever before, only the beginning is made in economic statistics. Whence, and by what routes, does the extra quantity of goods and service come?

CORRESPONDENCE

Relation of Unfilled Steel Orders to Rate of Production

To the Editor: On page 14 of THE IRON AGE for Jan. 3, there appears a brief discussion of the relation between ingot production and unfilled orders of the United States Steel Corporation, in the last paragraph of which is the following statement:

"Arguing from these premises it might be supposed that the present reduction in volume of unfilled orders . . . may presage a drop in ingot production."

The author then goes on to point out that:

"The general consensus of opinion, however, among those who have made a business of feeling the pulse of industry is that production generally is to remain at a high level for some months into 1924."

No attempt is made to reconcile the facts indicated on the chart with the opinion of the pulse feelers. May I venture to call attention to certain unusual conditions in the present situation which may be used for such a reconciliation?

1. Railroad shipments are more rapid than they have been for several years. Car shortage has practically disappeared. Consequently the manufacturer is not compelled to place his orders as far in advance as he did when railroad deliveries might be delayed.

2. The unusual demands of the war caused an expansion in capacity of the steel plants, so that now there is bound to be a considerable amount of idle equipment, even during periods of heavy demand. Consequently producers are in a position to make prompt deliveries, and the manufacturer is not forced to place forward orders to assure receipt of his steel when needed.

3. Pig iron prices have declined steadily, and there is today an unusually wide spread between price of pig iron and the price of finished steel. Consequently there has been a general belief (supported by price shading in particular instances) that the trend of steel prices would be downward, or at least would not be upward for some time to come. As a result of this belief, orders for steel would naturally be made in quantities barely sufficient to meet current needs, and forward orders cannot be looked for in any quantity until an upward trend is expected and manufacturers seek to cover at present low price levels.

4. There is a prevalent feeling of caution and uncertainty as to the trend of business in the next few months. So long as this feeling persists inventories will be kept at the lowest practicable limit.

It is doubtful whether the factors mentioned above can be found occurring simultaneously at any other point on the chart, and it is certain that any one who attempts to predict the future course of production by projecting a curve or applying a simple formula, without taking this unusual combination of factors into account, will come to grief. It is true that the amount of unfilled orders for steel is helpful in forecasting the future of steel production, but its trend must be interpreted in relation to many other facts. To use it alone is to lose sight of the complexity of business.

To summarize: The trend of unfilled orders is readily explained by facts which do not indicate a future downward trend of steel production any more than they do an upward trend. We merely have a condition which, so far as the facts before us would indicate, may continue indefinitely. When the production curve does turn upward or downward, it will do so because of the influence of new factors not yet visible.

C. S. CARNEY,
Personnel Research, White Motor Co.

Cleveland, Jan. 8.

Steel Treaters and New Jersey Chemists Hold Joint Session

The first joint meeting of the New York chapter of the American Society for Steel Treating with another organization was held Monday evening, Jan. 14, in Newark, N. J. A large delegation of steel treaters met a still larger number of members of the New Jersey Chemical Society at Stetter's restaurant, in Newark, preceded by a dinner at which at least 150 sat down. The usual January meeting of the steel treaters, scheduled for the evening of Jan. 16, was omitted in order to hold the common meeting with the New Jersey chemists.

After the dinner the chemists and metallurgists, numbering nearly 350, were addressed by Jerome Strauss, metallurgist and material engineer, United States Naval Gun Factory, Washington, who discussed "Corrosion Resistant Metals, Particularly Stainless Steel."

Mr. Strauss dwelt on the fact that although deterioration of materials for engineering construction has received constant attention from scientists for half a century or more, the demands of the engineer are still in advance of the metallurgists' ability to supply. He dealt with the facts influencing the selection of materials for specific purposes and discussed, from his own work and that of others, the properties of some of these commercial materials. Mr. Strauss dealt with some of the non-ferrous alloys, particularly duralumin, and paid particular attention to tubes made of stainless steel and some other products of the same material.

After the lecture a series of motion pictures was presented, among which was the "Story of Alloy Steel," shown by courtesy of the United States Bureau of Mines, followed by two films presented through the courtesy of the International Committee of the Young Men's Christian Association, entitled respectively, "Human Side of Steel Making" and "Wire and Wire Products."

The Iron Age and Its Readers

More than the usual number of favorable comments have reached this office on the value and scope of the Annual Review Number of THE IRON AGE. It is not surprising that the substantial character of the contents was apprehended even on the first perusal, seeing that the 140 pages of the reading section contained over 30 feature articles, more than 100 illustrations, many of them unusual charts and diagrams, as well as uncounted tables of prices and four folded charts.

It has been gratifying to find a widening reader interest, as shown by a steadily increasing subscription list, with a percentage of renewals probably the highest in the nearly 70 years of the paper's history. Another index to reader interest is the greater number of letters addressed to the editors and the increasing proportion of such letters intended for publication. When busy executives take the time to write for the benefit of their fellow readers, the medium that serves as the forum must be acceptable. The distinction is one which THE IRON AGE is glad to recognize, while not unmindful at the same time of the responsibility that goes with it.

Iron and Steel Markets

EXPANDING OPERATIONS

Aggregate of Small Demands Increasing

Building Activity and Railroad Equipment Factors—Sheets Firmer

The third week of the new year continues the scale of activity in orders and in steel mill operations to which the industry stepped up after the holidays. Already construction work appears as the dominant factor, with indications that the pace set in structural steel in 1923 will be maintained for months to come.

To take care of the larger aggregate of small demands from a variety of manufacturing sources, some of the leading producers, particularly in the Youngstown district, have increased their running schedules. As a whole the industry is not far from a 75 per cent operation, the Steel Corporation's rate, like last week's, being close to 85 per cent. The corporation has blown in two additional blast furnaces, one in the Pittsburgh district and one at South Chicago. Another will be added at Edgar Thomson this week. An independent furnace in the Pittsburgh district has just started up and one Youngstown and one Johnstown furnace are about to go in.

The approach of the soft coal conference to be held in Florida has brought up the possibilities of a strike and its effect on steel production. Stocks of coal are being built up and reserves on April 1 will be among the largest on record. Opinion leans to the expectation of a strike and a later compromise, with non-union fields meanwhile making a larger contribution to steel works operation than in the strike of 1922.

Railroad purchases in the past week include 4277 cars, practically the first so far in 1924. Of these 1200 are for Australia and 3057 for the Pacific Fruit Express, these latter, with what were placed in the last week of 1923, putting the Southern Pacific's total at 9612 cars. Of 73 locomotives bought, 57 were for the Santa Fe and 16 were for Canada. China is inquiring for 200 cars.

Car builders in the Chicago district have better assurance of operation, two shops there having taken orders that will carry them through the first half.

December bookings of fabricated steel, as computed by the Bureau of the Census, totaled 202,500 tons, somewhat more than April and only exceeded in 1923 by March. The year's purchases were slightly larger than those for 1922 and establish a record at 1,940,000 tons. The war years 1915 and 1916 showed a higher percentage put under contract but the country's fabricating capacity then was not so large.

In the week's structural developments, the Ford Motor Co. is again conspicuous, this time asking for bids on 15,000 tons for the River Rouge plant. Awards call for 12,500 tons, and on top of the two record years just closed, fresh inquiries continue in notable volume, amounting for the week to 53,000 tons.

Shading in prices of sheets has practically disappeared. Most of the independent makers are booked through the present quarter at the present operating rate of 80 per cent of capacity. Their position is better than that of the Steel Corporation's subsidiary, which is completing its Japanese orders.

Increased activity has developed in the pig iron market, especially in basic, of which two 5000-ton lots have been sold at St. Louis. There an inquiry is pending for 10,000 tons, while another inquiry for 10,000 tons comes from a southern Ohio company. A sale of 2500 tons of basic has been made to a Maryland tin plate plant. Sales of foundry iron to a cast iron pipe company amount to 60,000 tons. Prices on all grades, except charcoal, have been marked up 50c. at Chicago, and at Pittsburgh foundry and malleable have been advanced 50c. Sales at Cleveland included 9000 tons of malleable and foundry to a Michigan automobile foundry.

The Steel Corporation's latest purchases of scrap have attracted a good deal of attention. For the Lorain, Ohio, works 10,000 to 15,000 tons were taken in addition to a round lot for Vandergrift, Pa. Prices have been advanced $1 to $1.50 largely due to this buying.

British exports during the year included over 500,000 tons of tin plate, over 600,000 tons of galvanized sheets and nearly 300,000 tons of black sheets, of which latter Japan took 170,000 tons.

Another slight advance in foundry iron raises THE IRON AGE pig iron composite price to $22.04, from $21.96 last week. It was $26.63 one year ago.

For the first time since July there has come a change in finished steel, THE IRON AGE composite price being now 2.789c. per lb., against 2.775c. for the past six months and 2.789c. for the 11 weeks from May 8 into July. It was 2.474c. one year ago.

Pittsburgh

Volume of Orders Increases—Steel Plant Operations Respond to Demand

PITTSBURGH, Jan. 15.—The steel market this week reflects more strongly the conviction of buyers that prices are not going to be lower in the near future. It may also be said that while demands are on a rising scale the market reflects the belief that higher prices are not immediately ahead and that there is a distinct strain of conservatism in the buying. Manufacturers, practically without exception, have built up a comfortable backlog of orders and these have been added to in the past week to a considerable extent as the results of inventories have become known.

There is nothing on the horizon to suggest that the mills will not be able to make deliveries as required or that the railroads will not function in almost perfect fashion. Taking these elements out of the prospect, to say nothing of the evident intention of the mills to hold prices as far as possible at today's levels, the lack of big forward buying is easily understood. It now looks as though the business of the year would be spread out pretty well over the 12 months instead of piling in as it did last year during the first three or four months. Few take other than a very cheerful view of the year's prospects.

Steel plant operations this week have begun to re-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 15, 1924	Jan. 8, 1924	Dec. 18, 1923	Jan. 16, 1923
No. 2X, Philadelphia‡	$24.26	$24.26	$24.26	$29.76
No. 2, Valley furnace†	**22.50**	22.00	22.00	27.00
No. 2, Southern, Cin'ti†	25.05	25.05	25.05	27.05
No. 2, Birmingham, Ala.†	21.00	21.00	21.00	23.00
No. 2 foundry, Chicago*	**24.00**	23.50	23.00	29.00
Basic, del'd, eastern Pa.	23.25	23.25	23.25	28.00
Basic, Valley furnace	21.00	21.00	21.00	26.00
Valley Bessemer, del P'gh.	24.76	24.76	24.76	29.27
Malleable, Chicago*	**24.00**	23.50	23.00	29.00
Malleable, Valley	**22.50**	22.00	20.00	27.00
Gray forge, Pittsburgh	**23.76**	23.26	23.26	28.27
L. S. charcoal, Chicago	29.15	29.15	29.15	33.15
Ferromanganese, furnace	109.00	109.00	109.00	107.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	37.50
O.-h. billets, Pittsburgh	40.00	40.00	40.00	37.50
O.-h. sheet bars, P'gh.	42.50	42.50	42.50	37.50
Forging billets, base, P'gh.	45.00	45.00	45.00	43.00
O.-h. billets, Phila.	45.17	45.17	45.17	43.67
Wire rods, Pittsburgh	51.00	51.00	51.00	47.50
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.35	2.35	2.35	2.00
Light rails at mill	2.25	2.25	2.25	2.15

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.62	2.62	2.62	2.325
Iron bars, Chicago	2.40	2.40	2.40	2.35
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.10
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.74	2.44
Beams, Pittsburgh	2.50	2.50	2.50	2.10
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.74	2.44
Steel hoops, Pittsburgh	3.00	3.00	3.00	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Jan. 15, 1924 Cents	Jan. 8, 1924 Cents	Dec. 18, 1923 Cents	Jan. 16, 1923 Cents
Sheets, black, No. 28, P'gh.	**3.85**	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	**5.00**	4.90	4.90	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$20.50**	$20.00	$20.00	$37.00
Carwheels, Philadelphia	20.00	20.00	19.50	23.00
Heavy steel scrap, P'gh.	**21.50**	20.00	19.00	22.00
Heavy steel scrap, Phila.	**18.00**	17.50	17.00	20.00
Heavy steel scrap, Ch'go.	**17.00**	16.75	16.50	19.25
No. 1 cast, Pittsburgh	21.00	21.00	19.50	23.00
No. 1 cast, Philadelphia	20.50	20.50	20.00	23.00
No. 1 cast, Ch'go (net ton)	**20.50**	20.00	20.00	21.50
No. 1 RR. wrot. Phila.	**21.50**	20.00	18.50	23.00
No. 1 RR. wrot. Ch'go (net)	15.00	15.00	15.50	18.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$4.00**	$3.75	$4.00	$8.00
Foundry coke, prompt	4.75	4.75	4.75	8.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*12.75*	13.12½	13.25	14.87½
Electrolytic copper, refinery	*12.25*	12.62½	12.87½	14.50
Zinc, St. Louis	*6.35*	6.42½	6.20	6.87½
Zinc, New York	*6.70*	6.77½	6.55	7.22½
Lead, St. Louis	**8.00**	7.95	7.60	7.75
Lead, New York	8.25	8.25	7.75	7.95
Tin (Straits), New York	**49.50**	48.00	47.25	38.75
Antimony (Asiatic), N. Y.	10.00	10.00	9.00	6.75

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Jan. 15, 1924, Finished Steel, 2.789c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Jan. 8, 1924,	2.775c.
Dec. 18, 1923,	2.775c.
Jan. 16, 1923,	2.474c.
10-year pre-war average,	1.689c.

Composite Price, Jan. 15, 1924, Pig Iron, $22.04 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Jan. 8, 1924,	$21.96
Dec. 18, 1923,	21.88
Jan. 16, 1923,	26.63
10-year pre-war average,	15.72

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spond to the enlarged order books. This is particularly the case in the Youngstown district, where the two largest producers are running as full as it is physically possible. Steel company blast furnaces are starting up. The Carnegie Steel Co. this week blew in No. 1 stack at New Castle, Pa., and will put on another furnace of its Edgar Thomson group before the end of the week. Pittsburgh Crucible Steel Co. late last week blew in its No. 2 furnace while the Youngstown Sheet & Tube Co. is figuring on starting one or both of its Hubbard furnaces. Bethlehem Steel Co. is reported to be considering lighting two additional furnaces at Johnstown, Pa. These resumptions are looked upon as evidence that the steel companies actually are running short of pig iron, and instead of being a bearish factor in the pig iron market, probably forecasts a stronger market for that material.

A sharp advance in scrap since a week ago, which has carried the delivered price of heavy melting steel above the furnace base of basic pig iron, is believed to denote a shortage of scrap and a change in the steel furnace mix involving an increased use of pig iron. Prices of the latter have not changed since a week ago, but the market is distinctly firmer in tone and the common expectation is that the next sales will be at higher prices. There has been a decided stiffening in the fuel situation which finds its most plausible explanation in the building up of reserve supplies against possible interference with shipments during the latter part of the winter, and because of the possibility that the expiration of the present agreement between union coal mine operators and the United Mine Workers of America on April 1 will be followed by a strike or at least a suspension of union mine operations.

Some of the strip steel makers lack orders against which they can ship over the remainder of the month, and plates are another product in which real activity still is lacking. Otherwise bookings are good and show an expanding tendency. Jobbers are much freer buyers than they have been. Sheet makers embraced by the National Association of Sheet and Tin Plate Manufacturers in December made sales of approximately 350,000 tons, shipments of about 189,000 tons and produced about 161,000 tons.

Pig Iron.—The market is stronger, although not quotably higher except on foundry and malleable grades in which there has been an advance of 50c. a ton. At least two lots of the former, each of 1000 tons, have been sold at $22.50, Valley Furnace, and the business having been competitive, it is evident that supplies were not available at a lower figure. Steel company selling of foundry iron has practically ceased, and there has been a pretty general withdrawal of steel company offerings of the steel making grades or the naming of prices that indicated indifference about sales. There is heavy speculative demand for basic iron, chiefly from scrap dealers who figure that the pig iron may be turned over at a profit in the event that they sustain losses in covering against their scrap sales. There is an unconfirmed report that a central Ohio scrap dealer recently paid $22, Valley Furnace, for 10,000 tons of basic iron. A Youngstown district scrap dealer is trying to buy 5000 tons of iron at any grade. There has been no consumptive buying, in the absence of which we continue to quote basic iron at $21, Valley Furnace. Transactions are lacking on which to base any change in the price of December iron. The American Rolling Mill Co. has an inquiry out for 10,000 tons of basic iron, but it is not evident whether it is for the purpose of securing prices for inventory purposes or that an actual purchase is contemplated.

Note—THE IRON AGE in the table captioned A Comparison of Prices, under date of Nov. 29 last, gave the price of Bessemer iron from Valley Furnace at $24.26, delivered Pittsburgh. The correct price was $24.76, and should have been so quoted.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.00
Bessemer	23.00
Gray forge	$22.00 to 22.50
No. 2 foundry	22.50 to 23.00
No. 3 foundry	22.00 to 22.50
Malleable	22.50 to 23.00
Low phosphorus, copper free	29.00

Ferroalloys.—Some irregularity is cropping out in prices of ferromanganese and 50 per cent ferrosilicon. We note sales of about 1300 tons of British ferromanganese, 1000 tons of which was at the full price of $110, c.i.f. Atlantic seaboard, duty paid, while the remainder sold at that price with $1 a ton off for cash in 30 days. Another order is pending for 350 tons, on which the prospective buyer claims to have a price of less than $109. It is supposed that this low quotation is on some resale material being offered by a Middle Western consumer, whose purchases exceeded his requirements. Some of this material was sold a few weeks ago at $107, Atlantic seaboard, and the buyer already has received more than the original purchase at that price. The leading domestic maker still is quoting $109, seaboard. Competition for business in 50 per cent ferrosilicon has resulted in lower prices than $75, delivered. Prices are given on page 255.

Semi-Finished Steel.—Prices are not quotably higher, but the market is firm and is pretty well back to a Pittsburgh or Youngstown base; hitherto, there has been some business by outside mills on an f.o.b. mill base, but such mills now are well enough provided with orders for steel, finished or semi-finished, to be indifferent about additional business in semi-finished steel. There are higher quotations than $40 on billets and slabs and $45 for forging billets, but no sales are reported above these figures. Open market activities in skelp are very limited and the price is nominal. Rods are well sustained in price, but demand still is light and specifications against contracts reflect the fact that demands upon secondary manufacturers have not yet increased much. Prices are given on page 255.

Wire Products.—Demand is gradually but steadily expanding, particularly from the jobbers, who have pretty well completed their inventories and now have a line on their probable requirements. Buying is of a very orderly character, however, for there are no signs of higher prices in the near future, and speculative buying is entirely absent. The outlook is that buying will be held very close to actual requirements as long as the mills and the railroads are able to give the shipment service they are giving at present. There is some unevenness in warehouse prices in the East that is a little disturbing to manufacturers who are holding to the quoted mill prices, but there is no positive evidence of price cutting on the part of any of the producers. Prices are given on page 254.

Steel Rails.—Railroads are reported to be specifying satisfactorily against contracts for standard sections, and there is enough orders on the books of mills in this territory to keep them well engaged over the first half of the year. A good deal of suburban street railway business is expected in the near future. Light rails are as dull as ever, but with all makers of billet rails still holding to 2.25c., base. Higher prices for old rails have not yet been reflected in the prices of rerolled rails.

We quote light rails rolled from billets at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Standard pipe orders and specifications still are coming in quite freely, and there is no uneasiness as to the continued operation of a buttweld pipe furnace at the present high rate for some time, since all signs point to heavy building operations this year. Inquiry for oil country goods is steadily expanding, and while orders are not in keeping with that condition, makers are optimistic as to the future, since oil prices are daily gaining strength as a result of the fact that there is now only a slight difference between production and consumption and drafts upon surplus stocks are believed to be near at hand. Lapwelded steel boiler tubes are slow of sale and easy in price, at least one important producer having come out with a quotation of 1, 5 and 2½ per cent beyond the card, as against 1 and 5 per cent, the ordinary differential and preferential to jobbers. Sales of seamless tubes are increasing, and it is claimed that they are replacing lapwelded tubes in some cases. Prospect is not bright at the moment that locomotive builders will be heavy buyers this year, and one large maker in the East is reported to have cut operations and working forces in halves. Discounts are given on page 254.

Sheets.—Some mills lacking orders for delivery over the remainder of this month probably would take such business at less than the regular prices, but there are so few in that position, and they represent so little of the capacity, that the market may now be considered as restored to the bases of 3.85c. for black, 5c. for galvanized, 3c. for blue annealed and 5.35c. for automobile body stock. Most of the independent companies have sufficient business booked to carry them through the present quarter at the present rate of operations of somewhat above 80 per cent, but the pressure for shipments is not so heavy that they are passing up additional business. The Steel Corporation sheet-making subsidiary relatively is not as well booked as the independents, and its operations have suffered slightly through the completion of its Japanese orders. Prices are given on page 254.

Tin Plate.—The story of this product is pretty much a repetition of that for several weeks. The leading interest is obligated against probable production over the first half of the year, and the position of independents is practically as good; it is now merely a question of specifications, and so far these have been coming

in well and there is a high rate of mill operations and not as much piling of production as there some times is at this time of year. The price is $5.50 per base box, Pittsburgh, for standard cokes.

Iron and Steel Bars.—Makers of steel bars in this district note a marked quickening in both orders and specifications since a week ago. The question of price seems definitely settled, although the buyers, presumably because of good delivery, are not buying very far ahead of actual requirements. Iron bars still are only in fair demand but prices are firm.

Structural Material.—Heavy volume of inquiries is coming to local fabricating shops and since prospects favor awards against a large percentage of the projected business, the question of plain material prices seems to be solving itself. Mills without exception are holding firmly to the regular market prices. Prices are given on page 254.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Plates.—Orders are more numerous with practically all makers but still run almost exclusively to small tonnages. Buyers now appear to be convinced that there will be no cutting of prices. They are given on page 254.

Cold-Rolled Strips.—Difficulty in securing orders for early delivery is less evident in cold-rolled strips than it is in the hot-rolled material. Both orders and specifications are good with all makers and the price of 5c., base Pittsburgh, is now well established.

Bolts, Nuts and Rivets.—The completion of inventories has been followed by a considerable betterment both in new orders and in specifications against contracts. There has been no change in prices. Prices and discounts are given on page 254.

Cold-Finished Steel Bars and Shafting.—Business is good but hardly active. Automobile manufacturers are not yet ordering freely from the parts makers, and this tells on the demand for the bars. Local makers still are adhering firmly to 3c., base, Pittsburgh, but are equalizing freight charges with the Chicago rate in competitive territory. Ground shafting is unchanged at 3.40c., base, f.o.b. mill for carloads or more.

Hot-Rolled Flats.—Makers generally have a good volume of first quarter business booked, but not a little of it is for delivery after Feb. 1, this being especially true of strips, and not a few mills need orders for delivery over the remainder of this month. On quick shipment business, concessions from the regular price of 3c., base, are possible, but that price is firm on forward delivery business. Prices are given on page 254.

Track Supplies.—The market is firm at quotations on large spikes, most makers of which are well supplied with orders. Little price-cutting is observed in small spikes, despite the fact that demands are extremely light owing to the depressed soft coal situation. Prices are given on page 254.

Coke and Coal.—The past week has seen a considerable shrinkage in spot offering of furnace coke, due to the fact that contract buyers in a number of instances are specifying in excess of their contract quotas. While there are occasional offerings below $4 per net ton at oven, buyers who have tested the market lately have not been able to secure strictly standard fuel at less than that price. The contract market on furnace coke also shows a stronger tendency because of a disposition on the part of producers to allow their plants to remain idle rather than start them up at prices below cost of production. The lowest price lately quoted on tonnages for shipments over the remainder of this quarter was $4.25 and some are asking $4.40 because of the expectation that pig iron prices are going up and a belief that coke will be more valuable as April 1 draws near. Spot foundry coke shows no change in price, still being quoted at $4.75 to $5.50 for spot tonnages and from $5.50 to $6.50 for contract tonnages. The coal market shows a firmer tendency with mine run steam coal prices at from $1.60 in the Fairmont field up to $2 from nearby mines. We quote coking coal at $2 to $2.25, and gas coal from $2.25 to $2.50. Slack grade is selling readily at $1.65 for steam and $1.75 for gas.

Old Material.—Prices of heavy melting steel and of some of the other open-hearth grades are higher as a result of purchases by three independent steel companies, which aggregate about 30,000 tons. One company paid $21.50 to $22 for heavy melting steel, $19.50 for compressed sheets and $17.25 for blast furnace material; the others bought only heavy melting grade and paid $22. The week's advance of $1.50 to $2 a ton in the latter grade carries it above the furnace price of basic iron, which, while not unprecedented, is an unusual relation between the two materials. The advance in scrap from the most recent low point is now a matter of $6.50 a ton, as against a rise of about $1 a ton in pig iron. The market is very firm at the advance, however, and dealers are talking even higher prices. Conservative observers express the fear that further advances will encourage the use of pig iron at the expense of scrap; indeed, the Carnegie Steel Co. has put on one furnace and is considering the blowing in of others, and Youngstown independent will put on two furnaces between now and Feb. 1. Norfolk & Western Railway will take bids until noon, Jan. 16, on 12,350 gross tons of scrap.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$21.50 to $22.00
No. 1 cast, cupola size	$21.00 to 21.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	21.50 to 22.00
Compressed sheet steel	19.00 to 19.50
Bundled sheets, sides and ends	17.50 to 18.00
Railroad knuckles and couplers	22.00 to 23.00
Railroad coil and leaf springs	22.00 to 23.00
Low phosphorus blooms and billets ends	24.00 to 24.50
Low phosphorus plate and other material	23.00 to 23.50
Railroad malleable	19.50 to 20.00
Steel car axles	22.00 to 22.50
Cast iron wheels	19.50 to 20.00
Rolled steel wheels	22.00 to 23.00
Machine shop turnings	15.50 to 16.00
Steel bar crops	21.50 to 22.00
Heavy steel axle turnings	17.00 to 18.00
Short shoveling turnings	16.75 to 17.25
Heavy breakable cast	18.50 to 19.00
Stove plate	14.50 to 15.00
Cast iron borings	16.75 to 17.25
No. 1 railroad wrought	16.00 to 16.50
No. 2 railroad wrought	21.50 to 22.00

Large Warehouse to Be Built by Jones & Laughlin Steel Corporation

PITTSBURGH, Jan. 15.—The Jones & Laughlin Steel Corporation has plans ready to go ahead immediately with the construction of the largest steel warehouse between New York and Chicago, covering an entire city block and costing $300,000. The plans were revealed in Pittsburgh City Council when an ordinance was introduced calling for vacation of the 30-ft. strip along a South Side street to accommodate the track facilities for the new buildings. According to a statement made to a committee of council this afternoon by W. T. Mossman for the company, it is proposed to extend the present warehouse structure to cover the whole block bounded by South Twenty-Sixth, South Twenty-Seventh, Jane and Mary Streets, which is about 100,000 sq. ft. in area. The new warehouse will carry 35,000 tons of steel products and have a turnover of 100,000 tons a year. If the proposed vacation is granted, the Jones & Laughlin Steel Corporation will start work within 24 hours after the ordinance becomes effective and undertake to have the new project completed and in operation by the middle of March.

The new building will contain several bays for steel storage to be served by traveling cranes and will be equipped with shears, saws and other machinery for cutting steel to required lengths. The principal products to be warehoused will be shapes, plates and bars.

Chicago

Decided Improvement in Steel Market—Pig Iron Advanced

CHICAGO, Jan. 15.—Buying of finished steel has gathered momentum more rapidly than the mills had expected. For the leading interest the past week was the best in new business and specifications for four months. The foremost local independent has actual specifications on its books which will carry it practically through the current quarter. Prices are uniformly firm in all departments of the market and the outlook for further business is increasingly favorable.

The scope of construction activities is steadily broadening; in fact, fabricators cannot recall a time when so much work has been up for bids or on architects' boards at this season of the year. Building projects not only embrace a large number of small tonnages but also structures of unusual size. The new Palmer House, Chicago, will require 17,000 tons; a steel mill for the Ford Motor Co. at River Rouge, 15,000 tons; the Tribune Tower Building, Chicago, 7500 tons; and train sheds for the Chicago Union Station, 5000 tons.

Railroad buying continues to be an important factor in the market. The Minneapolis & St. Louis has ordered 5000 tons of rails and several other roads contemplate the purchase of both rails and fastenings. The Missouri Pacific is about to close for 14,000 tons of tie plates. The Southern Pacific has ordered 3057 refrigerator cars for which 20,000 tons of steel has already been placed with a local mill. It is a surprising fact that more steel has been bought for freight cars throughout the country since the middle of December than during the entire preceding seven months. Carbuilders are now in a position to continue operations on a broad scale and at least two shops in this territory have booked enough business to insure production through the first half. Additional large car orders are looked for and purchases of from 15,000 to 20,000 cars are said to be in prospect in this territory, although inquiries have not yet been issued. The Santa Fe has placed an order with the Baldwin Locomotive Works for 57 engines, including both passenger and freight types.

Demand for steel is in good volume from automotive interests, as well as practically all other classes of consumers. Even the farm implement industry, after three lean years, looks for an active spring business and is increasing its operations. Local mill operations have taken an upward turn. The Illinois Steel Co. has blown in a blast furnace at South Works, increasing the number of its active stacks to 20 out of a total of 27. It has increased its steel output to 80 per cent of ingot capacity and hopes before the close of the week to reach an 82 per cent level. The Inland Steel Co. continues on a 75 per cent basis.

The Union Pacific has bought $200,000 worth of machine tools for its Los Angeles shops. The orders were placed largely with Pacific Coast dealers.

Pig Iron.—Local iron has advanced to $24 base, Chicago furnace. The market shows strength, although it cannot yet be considered notably active. The trend of the situation, however, is undeniably toward more widespread buying, indicating perhaps that melters are coming in for their requirements as rapidly as their production programs are definitely arranged. A further indication pointing to this conclusion is the fact that spot buying has been heavier than had been expected so soon after the turn of the year. Forward contracting is also commencing to make itself felt. A farm implement manufacturer has closed for 600 tons of foundry for a down-State plant. A northern Illinois melter has ordered 300 tons of foundry and a Wisconsin user has placed 200 tons of malleable. A local user is inquiring for 500 tons of foundry for first quarter delivery. A Michigan melter has closed for 500 tons of foundry, but is understood to have bought from a Detroit furnace. Southern foundry has advanced to a minimum of $22, base Birmingham, with one furnace quoting $22.50, but no sales are reported in this territory. A Milwaukee melter has purchased 100 tons each of 8 and 15 per cent electrolytic silvery at less than Jackson County schedule. A Michigan user, on the other hand, placed 100 tons each of 7 and 8 per cent silvery at the full market.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal averaging sil. 1.50, delivered at Chicago..	$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	24.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00
Malleable, not over 2.25 sil.	24.00
Basic	24.00
High phosphorus	24.00
Southern No. 2	$28.01 to 28.51
Low phos., sil. 1 to 2 per cent, copper free	34.00 to 34.79
Silvery, sil. 8 per cent	37.29

Ferroalloys.—We note a sale of 500 tons of ferromanganese at $110 seaboard. A Canadian consumer is in the market for 2000 tons of ferromanganese for delivery over the next three months. A local user wants 500 tons of spiegeleisen for 60-day delivery.

We quote 80 per cent ferromanganese, $117.56, delivered; 50 per cent ferrosilicon, $75, delivered; spiegeleisen, 18 to 22 per cent, $47.58 to $48.58, delivered.

Plates.—More steel has been bought for freight cars in this country since the middle of December than during the entire preceding seven months. Car lettings during the past week have resulted in the placing of 20,000 tons of plates, shapes and bars with the Illinois Steel Co. The largest recent car order was 3057 refrigerator cars bought for the Pacific Fruit Express, involving a total of fully 31,000 tons of steel.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Bars.—Demand for soft steel bars is increasingly active, with both new business and specifications heavy. Buying has broadened to include a wide diversity of consumers, but prominent among purchasers have been jobbers, concrete bar dealers, automotive interests, cold finished steel producers and manufacturers of railroad car specialties. Farm implement makers are also showing keener interest in the market and report a marked improvement in their business prospects after three decidedly lean years. Soft steel bars are strong at 2.50c. Chicago. Demand for bar iron continues to lag.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. to 3c. base; hoops, 4.45c.; bands, 3.95c.

Cast Iron Pipe.—Pipe shops have accumulated substantial backlogs, particularly in the smaller sizes. In fact, on 4- to 10-in. inclusive the ruling market is now $49 base Birmingham for small lots and $48 for attractive tonnages, while on larger sizes $47 base Birmingham can still be done. Toledo has awarded 1450 tons to the National Cast Iron Pipe Co. Grand Rapids, Mich., has placed 1000 tons with the Lynchburg Foundry Co. Cincinnati takes bids Jan. 16 on 1000 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $60.20 to $61.20; 6-in., to 10-in., inclusive, $56.20 to $57.20; 12-in. and above, $55.20; class A and gas pipe, $5 extra.

Bolts and Nuts.—Specifications are steadily improving, although the market cannot yet be characterized as extremely active. This is probably accounted for by the fact that jobbers still have liberal stocks, having loaded up in the fall when prices were weak. Automobile manufacturers and farm implement makers, on the other hand, are buying liberally. While the agricultural machinery industry is not yet the factor it formerly was, it has specified at a heavier rate during the past month or two than for several years. The outlook for farm machinery is regarded as good; in fact, an active spring business is anticipated. At the same time, foreign demand for farm equipments is mak-

ing itself felt. One Western manufacturer recently shipped a trainload of 29 cars of implements for South American delivery. Bolt and nut discounts are firm.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ¾ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ¾ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Wire Products.—Buying is gradually increasing in volume and while the mills still have stocks, they regard the outlook as favorable. Liberal orders are being received from manufacturing consumers, but some of the jobbers are slow in coming in for their requirements, not yet having completed inventory taking. Demand for seasonal commodities has come up to expectations. Mill bookings in poultry netting, for example, are heavy. For mill prices, which are firm, see finished iron and steel, f.o.b. Pittsburgh, page 254.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.65c. to 3.80c. per 100 lb.; cement coated nails, 3.10c. to 3.25c. per keg.

Reinforcing Bars.—The building outlook is exceptionally favorable, but thus far actual bookings of reinforcing steel have been insufficient to materially alter the price situation. Steel for highway work, because it involves the least engineering work, is being bought under the most favorable terms. The Illinois State Department of Public Works and Buildings recently purchased 243 tons of plain, round 20-ft. lengths for April delivery at the regular mill price of 2.50c., base, Chicago, and bought 145 tons of deformed bars in miscellaneous lengths for delivery Feb. 15, at 2.75c., Chicago. The less desirable work, of course, is bringing higher prices, in some instances as high as 3c., Chicago warehouse. The largest new project to come up for bids is the New Palmer House, Chicago, involving 1000 tons of bars. In the Southeast a warehouse for the city of Norfolk, Va., will also take 1000 tons.

Lettings include:

Beaumont High School building, St. Louis, 550 tons to the Scullin Steel Co.

Service building for Board of Education, Milwaukee, 300 tons to Corrugated Bar Co.

Niss Furniture Co. building, Milwaukee, 250 tons to Corrugated Bar Co.

Illinois highway work, 243 tons to A. M. Castle & Co.

Illinois highway work, 145 tons to Olney J. Dean.

New water works, St. Paul, Minn., 410 tons to Clinton Bridge Co., Clinton, Iowa.

State highway bridge, Milford, Wis., 100 tons to Corrugated Bar Co.

Devonshire Hotel building, Chicago, 160 tons of rerolled bars to Inland Steel Co.

Federal Reserve Bank building, Little Rock, Ark., 125 tons to Laclede Steel Co.

Empire Construction Co., Des Moines, Iowa, 17 mile paving contract, 236 tons to Des Moines Steel Co.

Pending work includes:

New Palmer House, Chicago, 1000 tons.

Port Commission, City of Norfolk, Va., warehouse, 1000 tons.

Louisville & Nashville Railroad, warehouse, New Orleans, 200 tons.

Security Bank and Office Building, Chicago, plans being revised, 150 tons.

Lake Shore Athletic Club building, Chicago, 200 tons.

Illinois Bell Telephone Co., Superior exchange building, Chicago, 125 tons.

Telephone exchange building, Memphis, Tenn., 100 tons.

Libby-Owens Sheet Glass Co. plant, Toledo, Ohio, 325 tons, plans being revised.

Hartmann Furniture Co. Building, Chicago, 2000 tons.

Rails and Track Supplies.—The Minneapolis & St. Louis has placed 5000 tons of rails with the Inland Steel Co. The Missouri Pacific is about to close for 14,000 tons of tie plates. Railroads generally are showing interest in track supplies to accommodate rails previously ordered. A local mill has booked orders aggregating 6500 tons of tie plates.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Rivets.—Both large and small rivets are showing greater strength with improved demand. The minimum on large rivets is now $3.15, Chicago. Through a typographical error it was reported a week ago that 75 and 10 off was being done on small rivets. This should have read 70 and 10 off, and 70 and 5 off seems to better represent the market today.

Sheets.—Buying continues in good volume and mills generally are well booked. Most producers are now adhering to the Steel Corporation prices and such shading as still exists is of an exceptional character.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Structural Material.—Fabricating awards during the week totaled 6400 tons, while new projects will require 44,000 tons. Bids on the steel for the New Palmer House, Chicago, 17,000 tons, will be taken Feb. 1. Of this amount 9000 tons is wanted for 1924 delivery and the remainder for next year. At Detroit bids have been taken on a steel mill, for the Ford Motor Co., requiring 15,000 tons, while the J. L. Hudson store building in the same city will involve 5500 tons. The Roosevelt High School, Chicago, will take 3000 tons, and an early prospect is the Congress Hotel addition, Chicago, requiring a like tonnage. School construction in Chicago is assuming large proportions.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Coke.—Demand for foundry coke is increasing with local by-product material firm at $12.50, delivered Chicago switching district. A Michigan melter has purchased 2300 tons of by-product foundry for delivery at the rate of a car a day. Another Michigan user has closed for 800 tons of by-product core oven coke for first quarter shipment.

Old Material.—Outside of moderate sales of low phosphorous grades rerolling rails and malleable and scattered lots of cast scrap, the market has been quiet so far as consumer buying is concerned. Prices, however, are stronger, principally because of the strength shown in centers east of here. Heavy melting is reported to be bringing $22 to $22.50 at Youngstown, a price level which would permit shipments from this market. Dealers continue to buy liberally in anticipation of further advances. Railroad offerings include the Southern, 12,000 tons; the Chesapeake & Ohio, 9600 tons; the Rock Island, 3000 tons; the Wabash and the Northern Pacific, 2300 tons each, and the Chicago & Alton, 1500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$20.50 to $21.00
Cast iron car wheels	20.50 to 21.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Forged steel car wheels	20.50 to 21.00
Railroad tires, charging box size	21.00 to 21.50
Railroad leaf springs, cut apart	21.00 to 21.50
Rails for rerolling	18.50 to 19.00
Steel rails, less than 3 ft.	20.00 to 20.50
Heavy melting steel	17.00 to 17.50
Frogs, switches and guards cut apart	17.25 to 17.75
Shoveling steel	16.75 to 17.25
Drop forge flashings	12.50 to 13.00
Hydraulic compressed sheets	14.00 to 14.50
Axle turnings	14.50 to 15.00
Steel angle bars	18.50 to 19.00
Per Net Ton	
Iron angle and splice bars	21.00 to 21.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.50 to 27.00
Steel car axles	18.50 to 19.00
No. 1 busheling	13.50 to 14.00
No. 2 busheling	9.00 to 9.50
Cut forge	15.25 to 15.75
Pipes and flues	11.50 to 12.00
No. 1 railroad wrought	15.25 to 15.75
No. 2 railroad wrought	15.25 to 15.75
Steel knuckles and couplers	18.75 to 19.25
Coil springs	20.00 to 20.50
No. 1 machinery cast	20.50 to 21.00
No. 1 railroad cast	19.50 to 20.00
No. 1 agricultural cast	19.50 to 20.00
Low phos. punchings	16.50 to 17.00
Locomotive tires, smooth	18.00 to 18.50
Machine shop turnings	9.50 to 10.00
Cast borings	11.50 to 12.00
Short shoveling turnings	11.50 to 12.00
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Brake shoes	17.00 to 17.50
Railroad malleable	18.25 to 18.75
Agricultural malleable	18.25 to 18.75

New York

Pig Iron More Active—Buying of Finished Materials Freely in Small Tonnages

NEW YORK, Jan. 15.—The pig iron market is much more active and although orders placed have not been of large volume, pending business made up of tonnages ranging from 100 tons down to carload lots amounts to from 5000 to 10,000 tons. A machinery manufacturer has placed an order for 1000 tons for prompt delivery. The Worthington Pump & Machinery Corporation has revived its inquiry for about 2000 tons of various grades and is expected to place the business within a day or two. Other inquiries include 2000 tons of special analysis for first quarter, 700 tons of foundry iron for second and third quarter, 1200 tons for first and second quarter, 350 tons for second quarter, 300 to 400 tons for spot delivery and 200 tons for first quarter. Prevailing quotations continue to be $22, base Buffalo, and $23, eastern Pennsylvania, but reports indicate that these prices have been shaded 50c. on resale orders.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	25.27
East. Pa. No. 2, sil. 1.75 to 2.25	25.27
Buffalo, sil. 1.75 to 2.25	26.91
No. 2X Virginia, sil. 2.25 to 2.75	30.44
No. 2 Virginia, sil. 1.75 to 2.25	29.94

Ferroalloys.—Inquiries for ferromanganese, many of them urging early delivery, have appeared, the total amounting to several thousand tons, and there have been sales of some carload and larger lots at the prevailing prices which are still unchanged, although there have been reports of some shading of the British price of $110, seaboard. It is expected that as the weeks advance there will be considerable need of ferromanganese by steel producers in general. The spiegeleisen market is fairly active, with prices unchanged. Fairly liberal contracts for 50 per cent ferrosilicon and standard ferrochromium for 1924 consumption have been arranged with practically all important consumers. The contract price for 50 per cent ferrosilicon is $75 per ton, with a range of $75 to $80 for less than carload lots. There have been some sales of 75 per cent ferrosilicon, the quotation for which is $140 per ton, delivered.

Cast-Iron Pipe.—Business continues fair with a good volume of purchasing for spring and winter delivery by private buyers. Municipal tenders have not yet begun to appear, but a fair sized tonnage of water pipe is expected in about a fortnight from the Department of Water Supply, Gas and Electricity, New York. The usual concessions to buyers willing to accept winter delivery on pipe are still being made, while the higher quotations still prevail for spring delivery. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Purchasing of soil pipe is at a low ebb, the usual situation at this season, but makers are still busy shipping on old orders and with at least a part of this tonnage being used now in building permitted by the open weather, an active demand in the spring is expected. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 29½ and 35¾ per cent off list; heavy, 39½ and 45¾ per cent off list.

Warehouse Business.—The quietness of the past few weeks continues in practically all products. Despite the dullness, however, prices continue firm, even black and galvanized sheets, which generally fluctuate in price with the demand and supply, holding fairly well to quoted prices. A few lots of structural material for immediate use in building to take advantage of the open weather are being purchased. Warehouses handling alloy and special steels report slow delivery from mills, which apparently wait for an accumulation of orders on particular sizes. As a result, stocks in warehouse of some sizes of special grades of steel are low and there are transactions among dealers. The pipe market is quiet with an evident tendency in spots to shade current quotations. Nevertheless, warehouses expect a continued shortage of butt-weld pipe. The price of Swedish charcoal iron bars is unchanged at 7.00c. to 7.25c. per lb., base. Mills in Sweden have recently increased base prices, but as the market here is dull, importers are, for the present, absorbing the increase themselves. Brass and copper products have declined from ½c. to 1c. per lb. We quote prices on page 280.

Finished Iron and Steel.—Consumers and jobbers are buying steel more freely than at any time in months, but orders are all for small lots for early shipment, there being no inclination to anticipate requirements for more than two weeks to 30 days, except, of course, in the case of specific work such as buildings. Inquiry for structural steel is not quite so active as a few weeks ago, but there is enough work contracted for and in sight to engage the capacity of local fabricating shops for the next few months. A few fabricating shops are filled up for six months. With the exception of plates there is a little firmer tone to prices. Plates are freely offered at a basis of 2.40c. Pittsburgh, with 2.35c. available on tonnages that mills consider especially desirable. On structural shapes there are still quotations of 2.40c. Pittsburgh, but 2.50c. is more frequently the figure named than was the case last month. In sheets the price situation is considerably stronger in that more of the independent mills are adhering to the quotations of the leading interest on black and galvanized, namely, 3.85c. and 5c., Pittsburgh. Some resale lots of steel are being offered by certain consumers and jobbers who took in a great deal of low-priced material late in 1923 and are desirous of reducing inventory. Car and locomotive works are disappointed over the failure of railroads to come into the market for rolling stock, and the outlook for such buying is still in doubt. The New York, New Haven & Hartford Railroad is inquiring for 4500 kegs of track spikes and the Central Railroad of Vermont asks for 1500 kegs.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Old Material.—Under pressure of the higher prices being paid in other districts, material for eastern Pennsylvania consumers is showing a distinct upward tendency, although the consumers themselves have not yet been very widely affected by advanced price ideas. In order to make shipments of heavy melting steel on contracts in eastern Pennsylvania, dealers and brokers today are paying $18 per ton, delivered, with no very considerable quantities coming out at this price. From $16.75 to $17.25 per ton is being paid by some dealers for shipment to Weirton, West Va., of borings and turnings. Both cast borings and machine shop turnings are firmer, showing advances in the buying price New York of about 50c. per ton. Specification pipe is firm, $16.50 and $17 per ton being paid for eastern Pennsylvania delivery. Stove plate to a Harrisburg consumer has been advanced $1 to $17.50 per ton, delivered. Other grades show slight advances in sympathy with the higher market in the West.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$14.50 to $15.50
Steel rails, short lengths, or equivalent	15.50 to 16.00
Rails for rolling	15.50 to 16.50
Relaying rails, nominal	25.00 to 26.00
Steel car axles	17.00 to 18.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	15.00 to 15.50
Forge fire	10.50 to 11.00
No. 1 yard wrought, long	15.00 to 16.00
Cast borings (clean)	10.50 to 11.00
Machine-shop turnings	11.00 to 11.50
Mixed borings and turnings	10.00 to 11.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	13.00 to 13.50
Stove plate	13.50 to 14.50
Locomotive grate bars	14.00 to 15.00
Malleable cast (railroad)	16.00 to 17.00
Cast iron car wheels	15.50 to 16.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	15.50 to 16.50
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Coke.—Prices for prompt shipment continue weak. Activity is well sustained on orders for a few carloads.

Standard foundry is quotable at from $5 to $5.50 per ton for prompt shipment and standard furnace at $4 to $4.25 per ton, with medium sulphur at $3.75 per ton. By-product is quoted at $10.91, Newark and Jersey City, N. J.

St. Louis

Basic Demand Features Pig Iron Market—Railroads Believed Selling Short on Old Material

ST. LOUIS, Jan. 15.—The outstanding feature of the pig iron situation in this market is the demand for basic by East Side melters. The St. Louis Coke & Iron Co. reports the sale of two 5000-ton lots of basic to one concern for early shipment, while another East Side melter is in the market for 10,000 tons of basic for second quarter, their requirements for first quarter having been satisfied. The Granite City maker also reports the sale of 4000 tons of foundry iron for second quarter delivery to an Upper Illinois melter, and sales of carload lots totaling 400 tons. Most of the stove foundries in St. Louis, Belleville and Quincy are closed down for inventory. Job foundries are said to be doing a good business. The market is reported firm at $23.50, Chicago, for Northern and $21 to $22, Birmingham, for Southern.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$25.16 to $25.66
Northern malleable, sil. 1.75 to 2.25	25.16 to 25.66
Basic	25.16 to 25.66
Southern fdy., sil. 1.75 to 2.25 (rail)	26.17

Finished Iron and Steel.—Railroad inquiries continue an important part of the business in these lines. The Wabash Railway is in the market for its requirements for track bolts for first half, which amounted to about 2000 kegs during the same period last year, and also for its requirements for angle bars for first half. The Missouri-Kansas-Texas Railway has an inquiry out for 3500 kegs of standard track spikes for prompt shipment. The East St. Louis & Suburban Railway is in the market for 1250 to 2500 tons of rails, part being girder rails, the remainder 70, 80 and 90-lb. A. R. A. tee rails. In addition to 560 tons of structural steel the order given Spuck Iron & Foundry Co. for the William Beaumont Public High School, St. Louis, includes 80 tons of ornamental steel. There is little warehouse business.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, ¾-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagon blank, $2.50, and tapped, $2.50 off list.

Coke.—The extreme cold weather has had the effect of stimulating the demand for domestic and industrial grades of coke. Piles in dealers' yards have been reduced and they have been buying to replenish stocks.

Old Material.—A strong impression prevails that the railroads are selling short on old material. Lists closing this week total 38,000 tons, and material offered last week brought high prices. Dealers are bidding keenly for all material offered, and railroads seem to be eager to sell, although some of them are far behind on deliveries on old contracts. The opinion is expressed that all material to be sold this week will be quickly absorbed by dealers. Last week one railroad seemingly was so pleased with the price offered for 150 tons of one grade that it offered to sell the dealer 500 tons at the same price, which proposal was accepted. Several sales of round tonnages were made during last week to consumers of both rolling mill and melting grades. New railroad lists closing this week include: Northern Pacific, 2000 tons; Missouri Pacific, 3000 tons; St. Louis Southwestern 1500 tons; Great Northern 2000 tons; Kansas City Southern, 500 tons; Terminal Railway Association of St. Louis, 1500 tons; Norfolk & Western, 13,000 tons; Southern Railway and subsidiaries, 10,000 tons; Chicago & Alton, 1000 tons; Missouri-Kansas-Texas, 2000 tons; Wabash, 2000 tons.

	Per Gross Ton	
Iron rails	$18.00 to	$18.50
Rails for rolling	19.50 to	20.00
Steel rails, less than 3 ft.	20.00 to	20.50
Relaying rails, 60 lb. and under	25.00 to	26.00
Relaying rails, 70 and over	32.50 to	33.50
Cast iron car wheels	19.50 to	20.00
Heavy melting steel	17.50 to	18.00
Heavy shoveling steel	17.00 to	17.50
Frogs, switches and guards cut apart	18.00 to	18.50
Railroad springs	20.50 to	21.00
Heavy axles and tire turnings	14.00 to	14.50
Per Net Ton		
Steel angle bars	16.00 to	16.50
Steel car axles	20.00 to	20.50
Iron car axles	26.50 to	27.00
Wrought iron bars and transoms	20.50 to	21.00
No. 1 railroad wrought	16.50 to	17.00
No. 2 railroad wrought	16.00 to	16.50
Cast iron borings	11.50 to	12.00
No. 1 busheling	15.50 to	16.00
No. 1 railroad cast	19.00 to	19.50
No. 1 machinery cast	19.00 to	19.50
Railroad malleable	17.00 to	17.50
Machine shop turnings	10.50 to	11.00
Champion bundled sheets	10.50 to	11.00

Boston

Inquiries Fail to Develop into Actual Business to any Appreciable Degree

BOSTON, Jan. 15.—The larger inquiry for pig iron noted a week ago has failed to develop into actual business to any appreciable degree, and reported sales for the past week aggregated less than 2000 tons. Stove makers are fairly busy, but less so than before Dec. 1, while the textile machinery industry has received somewhat of a setback, and New England foundries in general are operating at a low ratio to capacity. Some melters who anticipated buying this month have decided to delay purchases until business volume is more clearly defined. It therefore is apparent that a large percentage of the recent inquiry was for inventory purposes. A New Britain, Conn., foundry is credited with the purchase of 200 tons of No. 2X Virginia iron at $24 furnace, or $29.92 delivered, which, if differentials are taken into consideration, represents a drop of 50c. Resale No. 2X eastern Pennsylvania is still available at $22 furnace, and resale Buffalo district iron at the same terms. Small tonnages of regular furnace iron from these two districts have been booked, however, at full market prices, and Virginia No. 2X at $26.50 furnace. Of the latest inquiries, that of the Gilbert & Barker Mfg. Co., Springfield, Mass., is the largest. It is for 500 tons No. 1X, with the stipulations that if the iron is bought it will not be until late in January, and that all prices must be submitted by mail only.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$27.15
East. Penn., sil. 1.75 to 2.25	26.65
Buffalo, sil. 2.25 to 2.75	$27.41 to 28.41
Buffalo, sil. 1.75 to 2.25	26.91 to 27.91
Virginia, sil. 2.25 to 2.75	30.42 to 32.42
Virginia, sil. 1.75 to 2.25	29.92 to 31.92
Alabama, sil. 2.25 to 2.75	31.10
Alabama, sil. 1.75 to 2.25	30.60

Cast Iron Pipe.—Medford, Mass., will receive tenders until Jan. 30, on 100 tons of 4-in., 6-in. and 8-in. pipe for 1924 requirements, and Wakefield, Mass., will close this week on 200 tons required this year. The Warren Foundry & Pipe Co. was the successful bidder on 150 tons of 8-in., 10-in. and 12-in. pipe required by Leominster, Mass., and approximately 100 tons of 6-in. wanted by Attleboro, Mass. Stone & Webster, Inc., Boston, is about to close on gas pipe required for its numerous New England subsidiary companies. With the closing of this contract practically all utility companies in this territory will have bought their 1924 pipe. Purchases have been larger than at any period during the past four or five years. Pipe makers quote openly on the following basis: 4-in. pipe, $72.10 deliv-

ered Boston common rate points; 6-in. to 14-in., inclusive, $67.10; 16-in. and larger, $65.10. Where buyers permit foundries to ship at their option up to March 1, concessions of $3 to $4 a ton have been named.

Shapes and Plates.—McClintic-Marshall Co. has been awarded 970 tons of structural steel for a Spartanburg, S. C., job. Bids closed the past week on 200 tons for a local service station. Several large tonnage inquiries have grown active recently, but negotiations are private; consequently details are lacking. It is reported, however, the aggregate tonnage runs well up into five figures. Going business in shapes is on a 2.40c. Pittsburgh base, generally. Inquiries for plates are on the increase, but individual tonnages are small. Orders placed the past week were at 2.35c. to 2.40c. Pittsburgh base.

Coke.—Shipments against by-product foundry coke contracts have dropped to small proportions once more. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to quote such fuel at $12.50 delivered within New England. Coke producers have made little impression on reserve stocks of crushed coke, due to milder weather, and within certain freight rate zones the market is lower. Because of the crushed coke situation, the foundry coke outlook is not so strong as it was a month ago. New England foundries in general have a fair supply of fuel on hand.

Old Material.—Old material is moving in greater volume than heretofore, prices for the first time in months being attractive to sellers. Most of the passing business is for independent steel mill consumption in the eastern Pennsylvania, Pittsburgh and West Virginia districts. Aside from scattered sales of machinery cast at slightly higher prices, New England industries are not interested in scrap. More car lots of heavy melting steel sold at $13 and $13.25 a ton on cars the past week, but the big turnover was on a basis of $14 to $14.50. Borings and turnings continue in good demand. Machine shop turnings are generally listed at $10 to $10.50 on cars in Massachusetts and points farther north, but $11 is offered freely in Connecticut. Bundled skeleton for steel mills is quoted at $10 to $10.50, up 50c. for the week. One concern offers $11.50 to $12 for forged fire scrap, but this price is considerably out of line with that named by dealers in general. On the average, material used by steel mills is 50c. a ton higher. The Boston Elevated Railway Co. has taken bids on 134,069 lb. malleable, 81,152 lb. cast iron and 337,965 lb. wrought iron and steel.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$23.00 to $24.00
No. 2 machinery cast	21.00 to 23.00
Stove plates	16.00 to 16.50
Railroad malleable	18.00 to 18.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$14.00 to $14.50
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1-in. in diam., over 2 ft. long)	12.00 to 12.50
Machine shop turnings	10.00 to 10.50
Cast iron borings, chemical	12.00 to 12.50
Cast iron borings, rolling mill	10.00 to 10.50
Blast furnace borings and turnings	10.00 to 10.50
Forged scrap and bundled skeleton	10.00 to 10.50
Shafting	17.00 to 17.50
Street car axles	17.00 to 17.50
Rails for rolling	14.50 to 15.00

Buffalo

Little Demand for Pig Iron and Prices Are Not Tested

BUFFALO, Jan. 15.—While pig iron prices are holding to the firm basis that became effective after the November buying, there is such little demand for any size tonnages that weakness is very likely impending. Of course, furnaces which booked big tonnages late in November will not permit any recession, but not all producers enjoy this condition and a disposition on the part of consumers to buy would likely develop more attractive quotations than now exist. A few desirable inquiries which might have come to Buffalo at another time have been taken by eastern Pennsylvania furnaces. Shipping on first quarter specifications is brisk. Only inquiries for small lots—and few of these—have been received this month. There is some quoting for second quarter requirements. Two furnaces are asking $23 for silicon 1.75 to 2.25, but it is possible to buy at less than that figure. To date consumers are little concerned with second quarter matters. January gives indication of being a quiet time with both buyers and sellers.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$23.00 to $23.50
No. 2 foundry, sil. 2.25 to 2.75	22.50 to 23.00
No. 2 plain, sil. 1.75 to 2.25	22.00 to 22.50
Basic	22.00
Malleable	22.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Sheet prices have developed a little strength and in several instances quotations slightly lower than 3.85c. for black and 5c. for galvanized have been withdrawn. Demand is slightly livelier. Bar prices are holding, but there is little occurring to make a market. Plate demand is especially quiet. Pipe specifications are unusually brisk.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Old Material.—Several tonnages of selected heavy melting steel have been sold in this district at $20 per ton, but, on the whole, the strong markets outside Buffalo have not affected the district. Material that would ordinarily come to Buffalo is being sold in Youngstown and Pittsburgh districts at $21.50. All consumers' stocks are low.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$20.00 to $20.50
Low phos., 0.04 and under	21.50 to 22.00
No. 1 railroad wrought	14.50 to 15.00
Car wheels	19.00 to 20.00
Machine shop turnings	13.50 to 14.00
Cast iron borings	13.50 to 14.00
No. 1 busheling	15.00 to 16.00
Stove plate	17.00 to 17.25
Grate bars	17.00 to 17.50
Bundled sheet stampings	12.00 to 13.00
Hydraulic compressed	15.50 to 16.50
Railroad malleable	20.00 to 21.00
No. 1 machinery cast	20.00 to 20.50

Birmingham

Asking Prices of Southern Iron Advanced by Alabama Furnaces

BIRMINGHAM, ALA., Jan. 15.—Southern furnace interests are asking $22 per ton as minimum for No. 2 foundry iron, and one of the smaller interests continues asking $23, but sales are still being made at $22. Some of the business coming in now will lap over into the second quarter of the year, though the greater number of the sales recently have been in small lots and for delivery during the first three months of the year. Necessity for a greater output of iron has come into sight and the Woodward Iron Co. will relight its No. 3 furnace this week. Another company will have a blast furnace ready for the torch before the end of the month and the Alabama Co. is pushing the relining and other work at its No. 1 furnace at Gadsden. Delivery on old contracts is just as steady as can be and as a consequence there is delivery of the iron as it is being produced and some of the surplus iron is leaving the yards. The conditions are more satisfactory, prospects being that before the end of the month $23 will be the base price for No. 2 foundry in this territory. The melt of iron in the home territory is increasing. Cast iron pipe plants and foundries in general are making a little spurt in production. The iron production in Alabama in January will exceed that of December.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$22.00 to $23.00
Basic	22.00 to 23.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—Further lettings are announced by the three large-sized cast iron pipe plants of this district, and reiteration is again heard that capacity operation of plants will be necessary for several months. Quotations for pipe remain steady. No verification is

to be had of the large-sized pipe makers having purchased iron in quantity for future needs. Negotiations have been reported for some time.

4-in. water, $51; 6-in., $47; larger sizes, $46; 4-in. gas, $56; 6-in., $52; standard sanitary pipe, $55; heavy gage, $45.

Coke Market.—No improvement is reported in the coke market in this district, small lot buying being the rule. Quotations show no impetus and the product is to be had at from $5 to $6 for the by-product foundry grade. The make is not being improved any, and the Woodward Iron Co. will place in commission some of its ovens which have been undergoing repairing.

Old Material.—More improvement is reported in the scrap iron and steel market in this district. Stove plate and No. 1 cast have been selling fairly well lately. Heavy melting steel still lags and price is low. Old material yards are well stocked and dealers are prepared for big business. Pipe makers are beginning to make contracts for old material. Prospects are bright.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$16.00
Heavy melting steel	$13.00 to 14.00
Railroad wrought	12.00 to 13.00
Steel axles	19.00 to 20.00
Iron axles	20.00
Steel rails	12.00 to 13.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	13.00 to 14.00
Stove plate	17.00 to 17.50
Machine shop turnings	6.00
Cast iron borings	8.00

San Francisco

General Improvement Continues—Pig Iron Is More Active

SAN FRANCISCO, Jan. 9.—The business improvement first noted about the middle of last month seems to be making satisfactory progress. Both importers and dealers generally report more activity in steel and iron now than two weeks ago, and judging by the volume of new business being booked, the first quarter of the new year starts out under the most auspicious circumstances. The betterment, now so favorable, has attained unexpected development much earlier than was expected, and it is pointed out that now being the stock taking period, business will be even more favorable when that annual event is completed. For some inexplicable reasons the trade situation in Los Angeles has slackened about as much as it has improved in the bay region of the State. This is probably explained, however, by the fact that Los Angeles has been enjoying a lengthy season of activity, and as the mills and foundries in that section have been very liberal buyers for the past few months, there is a disposition to use material on hand and not purchase additional until after inventories are taken. Considerable new work in the way of new buildings is already planned in this section of the State which will require a large tonnage of steel during the next six months. In this city the new Crocker Bank Building and the Pacific Gas and Electric Building, both on Market Street, with three new hotel buildings in the western part of the city, are prominent features. In Oakland the new county hospital and two large manufacturing plants will also utilize steel for construction.

Pig Iron.—Both importers and jobbers report business fairly active, with more actual sales during the last two weeks than for any similar period in the past two months or more. It is also noticeable that many of the inquiries of a month ago are now developing into business. Prices remain unchanged with $33 to $34 being quoted as the market range with these figures firmly held and practically no disposition whatever to shade for even the most favored customers. Among the jobbers there has been some talk about a prospective advance in prices, but as far as can be learned, this is unlikely at this time. Several cargoes are reported on the way and two cargoes of Scotch iron are announced as now being loaded for early dispatch, one for this port and one for Los Angeles. From the present outlook it is probable the imports for this month will equal the total for the last quarter. One vessel has just finished discharging 1000 tons, and a shipment of iron from China is expected to arrive within the next ten days.

Finished Iron and Steel.—The outlook for business makes a good showing as is evidenced by a small but gradual increase in buying orders. Where a month ago there was some small shading of prices on some lines, there is now a close adherence to asking figures and possibly a little more firmness. Business in December moved along in a sort of routine way and while it could not exactly be called dull, it was scarcely up to normal. Stock-taking is now in progress and fresh buying to fill up depleted lines is confidently expected. Prices show very little change as compared with two weeks ago. Bars, channels, angles and kindred stock are quotable at $3.75 base, while bands are $4.50 base. Structural steel is quotable at from $3.60 to $3.70, dependent upon quantities and conditions of sale. There is a large amount of concrete construction work not only in progress, but in prospect, in this section of the State, so the factors are looking forward to a steady business, and possibly substantial increase for the first quarter of the new year.

Coke.—Fair business is being done with imports making a better showing in volume. The buying orders now being booked for the first quarter of the year are better than might be expected considering the recent prolonged depression in this commodity. Prices remain about steady with $20 per ton on round lots of the best foreign grade. There is also a good inquiry for domestic coke of which the several sugar companies are now liberal buyers. One vessel at this port has just completed the unloading of 3000 tons and two vessels with considerable coke tonnage are expected to arrive about the latter part of the current month.

Old Material.—This is the only branch of the iron and steel business which is still reported as very dull. Buyers are taking very small quantities, apparently sufficient to keep them going from week to week. It is known consumers have very small supplies on hand, but even concessions in price fail to stimulate a buying interest. Receipts continue light and prices remain fairly steady at from $13 to $14 per ton. Reports from Los Angeles show that business there has quieted down and outside of a very moderate order from one mill the trade movement is of small volume. The current price there is about $12 to $13 per ton. It should be stated, however, that during the business activity of the last half of the year in that part of the State, accompanied by extensive buying, available supplies may have accumulated, and that pending the inventory taking period buyers may be holding off.

Detroit Scrap Market Is Active

DETROIT, Jan. 15.—There has been much activity in the scrap market in this district during the past week, large tonnages being sold for first quarter delivery. Advances of 75c. to $1.50 per ton have been registered on the grades most in demand and the market is very strong. Melters in some instances are beginning to inquire for off grades of pig iron to supplant the better grades of scrap in their mixture, due to the high price on this material. The malleable manufacturers are expecting increased inquiries following the New York auto show, and the automobile manufacturers are running on production schedules about equal to those in effect a year ago.

The following prices are quoted on a gross ton basis, f.o.b. cars, producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	$16.75 to $17.25
Shoveling steel	16.75 to 17.25
Borings	13.00 to 13.50
Short turnings	13.00 to 13.50
Long turnings	12.00 to 12.50
No. 1 machinery cast	18.00 to 19.00
Automobile cast	24.00 to 26.00
Hydraulic compressed	14.50 to 15.00
Stove plate	16.50 to 17.50
No. 1 busheling	12.50 to 13.00
Sheet clippings	11.50 to 12.00
Flashings	12.50 to 13.00

Cincinnati

Inquiry for 10,000 Tons of Basic from a Nearby Steel Works

CINCINNATI, Jan. 15.—An inquiry for 10,000 tons of basic pig iron from a steel works interest in this territory is the feature of the market. As this company has blast furnaces of its own, much interest is attached to the inquiry. Most of the inquiries for foundry and malleable grades are from shops connected with the automotive industry, and several orders ranging from 100 to 500 tons were placed last week. The price tendency is undoubtedly upward, and in southern Ohio an advance of 50c. to $1 per ton will likely become effective this week. There is no change in the Southern situation, and $21 is still the minimum at which iron can be had. A local melter paid $22, Birmingham, for five cars last week, but this was more or less of a special analysis. A central Ohio melter bought 300 tons at $21, Birmingham. There is little activity in silveries or Bessemer, sales being confined to single carloads at $32.50, furnace, and $23, furnace, respectively.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.77
Basic Northern	24.77
Malleable	24.77

Sheets.—The past week witnessed some heavy buying of sheets, particularly from manufacturers identified with the automotive industries. Some mills are sold up on No. 18 gage and lighter for first quarter. Prices generally are firming up, and most of the business placed in this district is being taken at 3c., 3.85c., 5c. and 5.35c. for blue annealed, black, galvanized and automobile body sheets respectively. Tin plate continues in good demand, with prices strong.

Structural Activity.—Four projects involving 3100 tons of steel are up for bids, with a number of others to come out before the end of the month. In fact, activity in the structural field is expected to be the heaviest for some years. Projects up include a power house at Wilson Dam, 350 tons; cattle barn at Ohio State Fair grounds, Columbus, 300 tons; Knights of Columbus Club, Columbus, 550 tons, and bridge work for the L. & N. Railroad, 1950 tons. An assembling plant for the Ford Motor Co. at Louisville, involving 1650 tons, is expected to be awarded this week.

Reinforcing Bars.—A number of inquiries are current, involving considerable tonnage. Prices are stiffening, and on an inquiry for 500 tons for first quarter delivery, prices quoted were uniform at 2.40c., mill. The Bourne-Fuller Co. was awarded 200 tons for the Tanners' Research Laboratory at Cincinnati. Large projects pending include the Heyburn office building at Louisville, 800 tons, and the plant of the Standard Sanitary Mfg. Co., Louisville, estimated tonnage requirements being 750.

Warehouse Business.—While orders are coming in fair volume, jobbers report that buying generally is for small tonnages, but the number of orders is encouraging. Jobbers point out that the first two weeks of the year are generally slow. There have been no changes in prices, and none is expected.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.50 per keg base; cement coated nails, $3.30 per keg.

Finished Materials.—While there is an improved demand for finished materials of all kinds, buying is still restricted to small tonnages. Shapes and plates are in only fair demand, but it is notable, according to some of the larger buyers that deliveries are now quoted on a more extended basis, three to four weeks being the best delivery promised. Bars have shown a noticeable improvement, and a number of fair-sized orders were placed during the past week. Cold-finished material is also in good demand, particularly from automobile parts makers, who have shown little hesitation in placing contracts for first quarter, and who, in some cases, are ordering materials, contracted for March delivery, shipped as soon as possible. Some parts manufacturers believe there will be a shortage of cold-finished materials during the first quarter. On hoops and bands, some mills are reported to be sold up for first quarter delivery. Wire products are improving, and orders for spring delivery are more numerous. Specialties are moving well, and it is said that at the present time more inquiries are current for frogs and switches from railroads than has been the case for the past four years. Inquiries from the coal mining districts are light, however, and this applies also to light rails. Track accessories are in fair demand, and a number of carload orders for track bolts, spikes and angle bars have been placed. Bolts and nuts are moving fairly well, and prices are firmer. There have been few changes in prices of finished products, and regularly established prices generally are now being firmly adhered to.

Coke.—Some fair orders were booked for foundry coke last week, but furnace and domestic grades are still inactive. Prices are inclined to lower levels, particularly on domestic grades, but as a general trend are unchanged from last week. We quote:

Connellsville furnace, $4.00; foundry, $5.00; New River foundry, $10.00 to $11.00; Wise County furnace, $4.75; foundry, $5.75; by-product foundry, $8.00, Connellsville basis.

Old Material.—Consumers are not taking much interest in the scrap market, and with the exception of carload sales of foundry grades, most of the scrap is going out of the district, Cleveland and Pittsburgh melters being buyers. Prices continue their upward trend, however, and some dealers see further advance in sight.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$12.50 to	$13.00
Iron rails	16.00 to	16.50
Relaying rails, 50 lb. and up	29.50 to	30.00
Rails for rolling	16.50 to	17.00
Heavy melting steel	16.50 to	17.00
Steel rails for melting	15.50 to	16.00
Car wheels	15.50 to	16.00
	Per Net Ton	
No. 1 railroad wrought	13.50 to	14.00
Cast borings	11.50 to	12.00
Steel turnings	10.50 to	11.00
Railroad cast	17.00 to	17.50
No. 1 machinery cast	20.00 to	20.50
Burnt scrap	13.50 to	14.00
Iron axles		24.50
Locomotive tires (smooth inside)	16.00 to	16.50
Pipes and flues	11.00 to	11.50

Cleveland

Finished Steel Market Active—Improved Demand for Pig Iron

CLEVELAND, Jan. 15.—The finished iron and steel market continues very active, particularly in steel bars. While not many first quarter contracts are now being placed, mills are getting a good volume of orders for lots of 100 tons and under from various consuming industries. A fair demand has sprung up from the agricultural implement manufacturers and some business is being placed by jobbers. On the whole, the demand is heavy from the automotive industry and business from other industries is fairly good. Pressure for prompt deliveries is being made by some manufacturers of automobile parts. Leading car manufacturers in the Detroit territory are reported to be operating at capacity and it is announced that the Buick Motor Co. plans an increase in capacity involving $11,000,000 in buildings and equipment. Prices appear firm on about all finished lines except plates, on which some of the smaller mills are still quoting 2.40c. A Cleveland mill has taken 500 tons for the New York Central Railroad at 2.40c., Youngstown. Inquiries for 3000 to 3500 tons of plates for a water pipe line in Boston and 3000 tons for a

water line in the Catskills have come from an Ohio fabricator who is figuring on these contracts. No new inquiries are pending for lake boats. The placing of the vessel by Pickands, Mather & Co., referred to last week, has been deferred. In structural lines the Louisville & Nashville Railroad is inquiring for 9000 tons of steel for bridge work and an inquiry has come out for the J. L. Hudson Co. Store Building, Detroit, requiring 3000 tons. There is still some shading below the 3c. price on wide strip steel, but hot-rolled strip shows signs of stiffening owing to the firmness of the slab market. The Wheeling & Lake Erie Railroad has placed 2000 kegs of spikes and 5000 kegs are pending from the Nickel Plate Railroad. The spike market is firm at 3c. base.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Pig Iron.—Buying has increased in volume and prices show a firmer tendency. Basic iron is beginning to show some life. Climbing scrap prices bring heavy melting steel up to $22 in the Valley district or $1 a ton above recent quotations on pig iron, and the fact that some steel plants will use more pig iron and less scrap in their open-hearth furnaces has caused a stiffening of basic iron prices and producers are now quoting this grade at $22, or an advance of $1 a ton. However, no sales are as yet reported at the advance. Basic inquiries have come from consumers as well as from pig iron brokers and scrap iron dealers. The American Rolling Mill Co. has an inquiry out for 10,000 tons of basic and a local interest reports that a consumer offered $22 for 20,000 tons of basic iron, but the offer was turned down. Foundry iron has advanced fully 50c. a ton in the Lake and Valley districts. Cleveland furnaces have made several small lot local sales at $23 for local delivery, and are now holding pretty closely to $22.50 for out of town shipment. In the Valley district, $22.50 is now the minimum price for the first quarter and a few sales have been made at $23. A Cleveland furnace took 750 tons at $22.50 Cleveland from a southwestern Ohio consumer for deliveries extending into the second quarter and 500 tons on the basis of $22.50 Valley for shipment in the Valley district, the seller in the latter case making a concession because of the freight disadvantage. One Lake furnace is holding to a minimum of $22.50 for the first quarter. Sales during the week included 9000 tons of malleable and foundry iron to a Michigan automobile foundry for delivery through April. The furnace taking this order booked 14,000 tons during the week, including one 1800-ton lot. An Erie consumer divided 800 tons between a local and Buffalo furnace. A few sales were made for the second quarter, but furnaces are not seeking contracts for that delivery. This business is being taken at an advance of about 50c. above first quarter prices and in Michigan and Indiana $23.50 is the minimum price for the more extended delivery. While some of the first quarter business is coming from foundries that had not previously covered for their full first quarter requirements, other consumers are evidently buying some first quarter iron to carry over into the second quarter, fearing that prices will advance should there be a soft coal strike April 1. Southern iron is firmer. Small lot sales are reported at $22 for the first quarter and one producer has announced a $22.50 price for the second quarter. We note the sale of several lots of Southern charcoal iron aggregating 1600 tons in the Pittsburgh district at $30. The Otis Steel Co. blew in its second Cleveland stack Monday.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25	23.50
Southern fdy., sil. 1.75 to 2.25	27.50 to 28.00
Malleable	23.50
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	$29.00 to 30.00

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are fair, having improved now that inventories are about over. New business in bolts, nuts and rivets is light, as most consumers are now under contract. Prices on both lines are well maintained except on small rivets, on which weakness has again developed. The extreme discount on these is 70 and 10 per cent off list.

Semi-Finished Steel.—There is still considerable new demand for semi-finished steel largely for conversion into finished material for the automobile industry. A Cleveland mill purchased 2000 tons of slabs at $42.50, Youngstown, which is the more common quotation, although slabs can still be bought at $40. Sheet bars are firm at $42.50. Three inquiries out during the week aggregate 19,000 tons of sheet bars and slabs. With orders on its books and the increased demands of its finishing department, a Youngstown producer has withdrawn from the market for the first half.

Sheets.—New demand is holding up well, particularly from the automobile trade. While mills are comfortably filled, some are in need of immediate specifications and are taking black sheets at 3.75c. and blue annealed sheets at 2.90c. However, considerable business is being booked at regular prices.

Alloy Steel.—A Cleveland forge shop has placed 3000 tons of 3½ per cent nickel steel and chrome vanadium steel for automobile work. Ohio mills are well filled with first quarter orders. Prices are firm at regular quotations.

Reinforcing Bars.—Jobbers are buying for stock and there is a fair demand for small lots for building work. Some very low prices are still being named on both billet and rail steel bars, but one mill is no longer shading 2.10c. on rerolled bars. Higher scrap prices may stiffen the market on the latter. The Bourne Fuller Co. has taken 250 tons for the Baldwin Reservoir filtration plant, Cleveland, and there is an inquiry for 135 tons for the Brotherhood of Locomotive Engineers' Building.

Coke.—The foundry coke market is dull, with sales limited almost wholly to prompt shipment fuel. Standard Connellsville foundry coke is unchanged at $4.75 to $6.50 for prompt shipment. Some additional first quarter contracts for Wise County foundry coke have been placed at $6.50.

Old Material.—The National Tube Co. came into the market during the week for heavy melting steel scrap for its Lorain works and made purchases at $20.50. It is reported that these aggregated from 10,000 to 15,000 tons. Sales of heavy melting steel are reported at as high as $22 to a Youngstown mill and dealers have paid $21.50 for this grade. A Cleveland mill purchased a round tonnage of blast furnace turnings at $16.25 to $16.50 and a fair volume of other scrap purchases was made by consumers during the week. Prices have continued their upward trend. Heavy melting steel has advanced $1.50 a ton and most other grades from 50c. to $1 a ton. Dealers are paying local producers $18.50 to $19 for heavy melting steel.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$19.00 to $19.50
Rails for rolling	19.50 to 20.00
Rails under 3 ft.	20.00 to 21.00
Low phosphorus melting	20.75 to 21.00
Cast borings	16.00 to 16.25
Machine shop turnings	15.00 to 15.25
Mixed borings and short turnings	16.00 to 16.25
Compressed sheet steel	17.00 to 17.25
Railroad wrought	17.00 to 17.50
Railroad malleable	20.75 to 21.00
Light bundled sheet stampings	14.00 to 14.25
Steel axle turnings	16.25 to 16.50
No. 1 cast	21.50 to 22.50
No. 1 busheling	14.50 to 15.00
Drop forge flashings	13.75 to 14.25
Railroad grate bars	18.50 to 19.00
Stove plate	18.50 to 19.00
Pipes and flues	15.00 to 15.50

Westinghouse Electric & Mfg. Co., East Pittsburgh, will erect a large assembling and high tension insulator plant at Emoryville, Cal. It is proposed to make knocked down parts shipments to that plant for assembling for both the Pacific Coast and export trade. Bids are being taken for the equipment for this plant, which includes one large crane and 10 of smaller capacity.

Philadelphia

Railroad Demand an Important Factor in Further Gain in Sales of Finished Steel

PHILADELPHIA, Jan. 15.—The Pennsylvania Railroad is the center of interest in the local steel trade because of its gradually expanding program of steel buying and the official announcement expected this week of the concentration of the system's purchasing offices in Philadelphia. Hereafter, it is stated, all buying for lines east and west will be done in Philadelphia. The Pennsylvania, as well as other railroads, has placed numerous orders within the past week. Excepting one lot of 1800 tons of tie plates, most of the railroad orders have been small, ranging from 50 to 500 tons, but they have come from several roads and have covered a number of products, principally plates, shapes, bars, billets, bolts, nuts and spikes. More suspended plate tonnage has been released by the Pennsylvania, the most recent releases affecting material for car repairs. Some of the suspended tonnage was held up in February, 1923, and some of it was placed at prices below today's market. Buying of steel from all sources continues to show improvement, but orders are seldom for more than 30 days' requirements except in tin plate and pipe. Aside from the railroads, jobbers and companies engaged in automobile work are among the most active buyers.

A cast iron pipe company has purchased upward of 60,000 tons of foundry iron for plants in three districts, but otherwise the pig iron market is not active. Further excitement in the scrap trade has been caused by the purchase by the Steel Corporation of a tonnage of steel scrap for Vandergrift, Pa., at $23, delivered.

Pig Iron.—Consumers of pig iron are again showing confidence in the market by coming in for somewhat larger tonnages than has been the rule in recent weeks, and prices, which are on the basis of $23, furnace, for foundry grades, are holding firmly except where furnaces are obliged to equalize freight rates. There have been few orders exceeding 500 tons, except that the total purchases of a cast iron pipe company for its plants in three districts have exceeded 60,000 tons, a part of which is for its Eastern plant. A Maryland tin plate mill has bought 2500 tons of basic iron for shipment from a furnace near Pittsburgh. The Brooke furnace will go in blast this week and the Temple furnace will be blown out shortly.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.76 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 24.63
East. Pa. No. 1X	24.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivery eastern Pa.	23.25 to 23.50
Gray forge	23.00 to 23.50
Malleable	24.25 to 24.50
Standard low phos. (f.o.b. furnace)	27.00 to 27.50
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—The leading domestic maker of ferromanganese continues to quote $109, furnace, and orders are in fair volume. It is stated that the recent sale of British ferromanganese at $110, seaboard, with a discount of one-half of 1 per cent for payment in 30 days has not been repeated either by this seller or any of the agents of other British producers.

Semi-Finished Steel.—There is very little inquiry for billets, but prices remain firm at $40, Pittsburgh, for rerolling quality and at $45 for forging quality.

Plates.—Some of the Eastern plate mills report that orders so far this month, and operations as well, exceed those of December, and that month showed a gain over November. As the curve is upward, the plate mills feel somewhat encouraged, despite the present smallness of their backlogs. The release of locomotive plates by the Pennsylvania Railroad a week or so ago, followed by the release during the past week of old orders for car plates, has helped out a few of the mills. Some of these orders were placed at less than 2.40c., Pittsburgh, but a good part of the tonnage released was entered by the mills at 2.40c. and 2.50c. The large amount of building construction recently contracted for has given at least one interest a fair amount of universal plate tonnage, but orders for sheared plates are not plentiful. On desirable tonnage 2.35c., Pittsburgh, is occasionally done, but the general run of small orders is not being taken below 2.40c.

Structural Material.—Jobbers are placing orders for stock shapes, which is helping out some mills which have not participated to any large extent in recent lettings of steel buildings. Less is heard of 2.35c. quotations of plain material, though apparently this price has not disappeared entirely; however, 2.40c., Pittsburgh, is more frequently the asking price and one large producer now quotes 2.50c. as its minimum.

Bars.—Makers of automobile drop forgings have been buying bars freely, and more orders are coming from the railroads, particularly the Pennsylvania. Soft steel bars rolled from new steel are firm at 2.40c., Pittsburgh, but rerolled bars are offered at 2.30c. and 2.35c., while reinforcing bars are available out of stock at 2.40c., Pittsburgh base. Bar iron remains at 2.30c., Pittsburgh, from Eastern mills. Makers of bolts, nuts and rivets report greatly increased orders so far this month, mostly from the railroads. Spikes and track bolts have also been bought freely.

Old Material.—The recurrence of buying of steel scrap by the Steel Corporation, this time for the mills of the American Sheet & Tin Plate Co. at Vandergrift, Pa., has caused further excitement in the Eastern scrap trade, which is largely engaged in filling orders for mills in the Pittsburgh district as Eastern mills are not active buyers. The Vandergrift purchase was at $23, which is $1 more than had been paid during the few days preceding by mills at Weirton, W. Va., and Steubenville, Ohio. The effect of this activity in the Pittsburgh district has not been fully reflected in the Eastern market because of the absence here of any important inquiry. Small sales have been made at $18, and it is doubtful whether any further business would be considered below $18.50 or $19, delivered eastern Pennsylvania. Several other grades of scrap are higher than last week, among them low phosphorus, railroad and yard wrought and No. 1 forge fire. Sales of No. 1 yard wrought have been made at $20.75 and $21, delivered.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$18.00 to $18.50
Scrap rails	18.00 to 18.50
Steel rails for rolling	19.00 to 19.50
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Couplers and knuckles	22.00 to 23.00
Cast-iron car wheels	20.00 to 21.00
Rolled steel wheels	22.00 to 23.00
No. 1 railroad wrought	21.50 to 22.00
No. 1 yard wrought	21.00 to 21.50
No. 1 forge fire	16.00 to 16.50
Bundled sheets (for steel works)	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine shop turnings (for steel works use)	15.50 to 16.00
Machine shop turnings (for rolling mill use)	15.50 to 16.00
Heavy axle turnings (or equivalent)	17.00 to 18.00
Cast borings (for steel works and rolling mills)	14.50 to 15.00
Cast borings (for chemical plants)	18.00 to 18.50
No. 1 cast	20.50 to 21.00
Heavy breakable cast (for steel plants)	18.00 to 18.50
Railroad grate bars	17.00 to 17.50
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	18.50 to 19.00
Wrought iron and soft steel pipes and tubes (new specifications)	17.50 to 18.00
Shafting	25.00 to 26.00
Steel axles	24.00 to 25.00

Sheets and Tin Plate.—One large independent maker of tin plate is not soliciting further orders for first half, its capacity for that period having been sold. The demand for sheets is improving, and the price situation is firmer. There is now comparatively little deviation from 3c. for blue annealed, 3.85c. for black and 5c. for galvanized.

Warehouse Business.—Local jobbers report expanding sales of steel out of stock, and they in turn are placing orders quite liberally with the mills, though as a rule they are not anticipating requirements of more than a few weeks. Prices for steel out of stock are unchanged, for local delivery being as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅛ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅛-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

British Iron and Steel Market

Railroad Strike Impends—Depreciation of Exchanges a Continental Factor—Ruhr 10-Hr. Day Causes Strikes

(By Cable)

LONDON, ENGLAND, Jan. 15.

Complicated by the threatened railroad strike, the iron and steel position is further disturbed by the chaotic condition of Continental exchange rates. Pig iron is easy on renewed competition from Continental producers and less activity on the part of domestic buyers. No. 3 Cleveland is being sold at 99s. ($20.99). Scotland is buying fair quantities of Continental foundry and basic iron.

Hematite is quiet but prices are being maintained. Foreign ore is quiet. Sellers of Bilbao Rubio ask 23½s. ($4.98) and of North African ore 22s. ($4.66), both c.i.f. Tees.

Finished iron and steel demand is increasing, but few orders are being placed. Germany is inquiring for large lines of plates. Australia is buying plates. Prices are firm.

Exports of pig iron in December, excluding ferroalloys, were 46,824 tons, the total of all iron and steel having been 354,906 tons.

Continental position is disorganized by depreciation of the franc. Makers generally are quoting in sterling but merchant sales are being made at fairly low figures. Merchant bars are being sold at £7 7½s. (1.40c. per lb.) cost and freight to India.

On the continent, Belgian and Luxemburg ironmasters are handicapped severely by railroad congestion, resulting virtually in the closure of the port of Antwerp.

In the Ruhr many strikes are taking place in the steel works, against the introduction of longer hours.

Tin plate is quiet but firm. The works are well placed. Exports last year totaled over 500,000 tons.

Galvanized sheets are dull as regards Indian buying, but Australia and South Africa offer fair markets. Last year's exports were over 600,000 tons.

Black sheets are firm but the demand is spasmodic. German 18 to 20 gage sheets are being offered at £11 10s. (2.18c. per lb.) at the works. The total British export of black sheets last year was nearly 300,000 tons, of which Japan took 170,000 tons.

The members of the Electric Hoist Manufacturers Association report a decrease of 5.245 per cent in the number of hoists ordered during December as compared with the previous month, and a decrease of 15.20 per cent in the value of orders received. Shipments for December increased 21.90 per cent as compared with November.

COAL STRIKE EXPECTED

Strong Probability of Cessation of Mining in Bituminous Districts April 1

PITTSBURGH, Jan. 15.—Expectation of a soft coal mine strike or suspension with the expiration of the present agreement between operators and the United Mine Workers of America, on April 1, is daily becoming more pronounced. Too much of the current requirements are being supplied from the non-union fields for the comfort or satisfaction of the union operators, who now find it possible to operate on only a restricted scale, which means operating at a loss, and many have been forced to shut down their operations completely because the competition of the non-union mines has been too stiff. It is believed that the union officials in the conference soon to be held at Jacksonville, Fla., will hardly accept any downward revision of the present scales and few can figure that the operators will bind themselves for another year and possibly two years to mining rates which now are proving such a hardship.

Test of Strength Inevitable

A test of strength appears inevitable, and if there is not a strike most observers incline to the belief there will be a suspension in union fields while an agreement is being negotiated. The idea that the union mine operators want a strike for the benefit of their own purses does not appear well founded, because in the event of a suspension the non-union mine operators able to keep their mines going would reap the benefit of any advance in prices, and it has been noted that with the conclusion of former strikes prices usually have soon lost their gains. Thus, the union mine owner would hardly profit by a strike or suspension. What the union mine operators want is a wage scale that makes it possible for them to compete with the non-union mines, but this would mean considerable elasticity in the union scales, as any reduction in the union fields would probably be followed by cuts in the non-union producing districts and leave the situation much as it is at present.

Trend Toward Open Shop

Looking at the situation from this angle suggests the thought that either all mines must be operated on a union basis or all on an open shop arrangement. The trend is in the latter direction, since most producers of coal want more freedom in the matter of making wage changes to meet changing market conditions than a hard and fast agreement with the union permits. There has been considerable quiet building up of coal stocks in the past month or two, and it is said that reserves as of April 1 will be the largest the country has ever known.

If there is trouble and it even extends as did the 1922 strike to the non-union fields, the country would be well prepared for a struggle, and considerably more dependence could be placed upon the non-union coal supply this year than two years ago. At that time it was figured that the non-union fields were capable of producing more than 60 per cent of the country's requirements; the estimate now is that such mines would be able to ship an even greater percentage because the last agreement between miners and operators was by districts or individual operators in a district rather than for the so-called central competitive field as a whole, and in the past few months there have been a number of withdrawals from the ranks of union mines. It would be pretty hard to state accurately today which are union and non-union mines in several nearby districts, because there have been so many cases where the men have preferred steady work at lower wages than to stand complete loss of work.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3c.
Bands, base, per lb.....3c.
Strips, base, per lb.....3c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.7
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Glavanized wire No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg..... 2.70
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ¾ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.50c. off list
Hot pressed nuts, tapped.....4.50c. off list
C.p.c. and t. square or hex. nuts, blank.....4c. off list
C.p.c. and t. square or hex. nuts, tapped.....4c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅝ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	Per 1000 U. S. S.		Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80	⅝-in.	$15.00	$15.00
5/16-in.	5.50	6.00	¾-in.	19.50	20.00
⅜-in.	6.50	7.00	⅞-in.	28.50	28.50
7/16-in.	9.00	9.50	1-in.	37.00	37.50
½-in.	11.00	11.50		58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled square and hex. head cap screws.....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws .....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.90
Small rivets .....60, 10 and 5 to 70 and 10 off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb.....$3.05 to $3.15
Spikes, ½ in., 7/16 in. and ⅜ in., per 100 lb..... 3.25 to 3.50
Spikes, 7/16 in..... 3.25 to 3.50
Spikes, boat and barge, base, per 100 lb..... 3.25 to 3.50
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.00 to 4.25
Track bolts ½ in. and ⅝ in., base, per 100 lb.. 5.00 to 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜.....+11		+39
¼ to ⅜.....	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½.....	30	13
1 to 3.....	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6.....	59	47½	2½	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	41½	7 to 12.....	26	11
11 and 12....	53	40½			

Butt Weld, extra strong, plain ends

¼	41	24½	2 to 3.....	61	50½
¼ to ⅜.....	47	30½	¼ to ⅜.....+19		+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½.....	60	49½	1 to 1½.....	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4.....	57	46½	2½ to 4.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12....	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1½ in. .....+18	
2½ to 2¾ in.....	37	1¾ to 1⅞ in.....+ 8	
3 in.	40	2 to 2¼ in.....— 2	
3¼ to 3¾ in.....	42½	2½ to 3 in.....— 7	
4 to 13 in.....	46	3¼ to 4½ in.....— 9	

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	55	3 and 3¼ in.....	36
1¼ and 1½ in.....	47	3½ and 3¾ in.....	37
1¾ in.	31	4 in.	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		

Hot Rolled

3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in....	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be hold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage.....	35
2-in. O.D. 10 gage....	17	1½-in. O.D. 9 gage...	15
2¼-in. O.D. 12 gage..	17	5¾-in. O.D. 9 gage...	55
2¼-in. O.D. 11 gage..	18	5½-in. O.D. 9 gage...	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb base	$11.00	20-lb. coating I. C....	$14.90
8-lb. coating I. C....	11.30	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	38c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$109.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	$109.00 to 110.00
Ferrosilicon, 50 per cent, delivered	74.00 to 75.00
Ferrotungsten, per lb. contained metal	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	10.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent.....$38.00 to $39.00
Spiegeleisen, domestic, 16 to 19 per cent..... 37.00 to 38.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50.
Silvery iron, 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines 23.50
Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton		6.00 to 7.00
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain mangnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		48.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	40.00
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.35c.
Skelp, sheared, per lb.	2.35c.
Skelp, universal, per lb.	2.35c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails light, new steel, base, lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.00 to $3.15
Spikes, ½-in. and smaller, base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Cold finished steel bars, base, Chicago per lb.	3c.
Ground shafting, base, per lb.	3.40c
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	$5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown Comb	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.26
Boston, export	0.255			†Denver (pipe)	1.17

*Pacific Coast	$1.15	Memphis	0.56
*Pac. Coast, ship plates	1.20	Jacksonville, all rail	0.70
Birmingham	0.58	Jacksonville, rail and water	0.415
		New Orleans	0.67

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Bookings of 1923 a Record—December Second Month of Year

WASHINGTON, Jan. 15.—Sales of fabricated structural steel in December, reported by 146 firms with a capacity of 224,982 tons, amounted to 181,741 tons, representing 81 per cent of capacity, according to the Bureau of the Census. Computed total bookings in December totaled 202,500 tons.

Shipments in December represented 66 per cent of capacity as against 70 per cent in November and 80 per cent in October.

The total bookings for 1923 were 1,940,000 tons, as indicated in the accompanying table. This represents about 65 per cent of the annual capacity against 64.3 per cent for 1922, and is the largest volume yet recorded for a calendar year. Bookings were at a somewhat higher rate in 1915 and 1916, but capacity was not so large and the tonnage of contracts for the two years, respectively, was 1,630,000 and 1,666,000.

Computed Bookings of Fabricated Steel in 1923

January	185,000	July	125,000
February	197,500	August	145,000
March	235,000	September	130,000
April	200,000	October	120,000
May	140,000	November	135,000
June	125,000	December	202,500

Week's Orders Over 12,000 Tons and Fresh Inquiries Call for 53,000 Tons

The Ford Motor Co. is again conspicuous in the fabricated steel field, this time in an inquiry for 15,000 tons for the River Rouge plant. As indicated in the following items, awards of the week embrace 12,100 tons and new proposals over 53,000 tons:

Apartment building for Henry Mandel, Forty-ninth Street, New York, 400 tons, to Post & McCord.

Horn & Hardart Co., bakery, 600 West Fiftieth Street, New York, 600 tons, to Levering & Garrigues Co.

Apartment building, 51-55 East Seventy-second Street, New York, 500 tons, to McClintic-Marshall Co.

Levy Brothers' loft building, Thirty-eighth Street and Eighth Avenue, New York, 2000 tons, to Harris Structural Steel Co.

Bing & Bing apartment building, East Fiftieth Street, New York, 600 tons, to Hedden Iron Construction Co.

Carl Schurz high school, addition, Chicago, 2100 tons, to A. Bolter's Sons.

Balaban & Katz, Chicago, North Side theater, 1700 tons, to Morava Construction Co.

Mount Vernon Car Mfg. Co., Mount Vernon, Ill., wood mill and power house, 700 tons, to McClintic-Marshall Co.

Joliet Township high school, auditorium extension, 505 tons, to Duffin Iron Works.

Standard Sanitary Mfg. Co., kiln building, Kokomo, Ind., 229 tons, to Insley Mfg. Co., Indianapolis.

Great Northern Railway, 3 through plate girder spans and 1 deck plate girder span, 158 tons, to American Bridge Co.

Memorial Building, Racine, Wis., 155 tons, to C. Hennecke Co.

Masonic Temple, Wright's Grove, Ill., 150 tons, to unnamed fabricator.

Archdiocesan Seminary, Area Ill., 149 tons, to unnamed fabricator.

William Beaumont high school, St. Louis, 560 tons, to Spuck Iron & Foundry Co.

Montgomery Building, Spartanburg, S. C., 970 tons, to McClintic-Marshall Co

Lehigh Portland Cement Co., engine room at Mason City, Iowa, 150 tons, to Worden-Allen Co.

Pickands, Mather & Co., ore trestle at Hibbing, Minn., 110 tons, to Lakeside Bridge & Steel Co., Milwaukee.

Milwaukee Structural Steel Co., fabricating shop, 300 tons, owner does work.

The Anchor Drawn Steel Co., Latrobe, Pa., plant building, 100 tons, to McClintic-Marshall Co.

Pennsylvania Railroad shops, Olean, N. Y., 250 tons, to Kellogg Structural Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Public schools Nos. 33, 116 and 197, New York, totaling 3500 to 4000 tons.

Cornell Union, Cornell University, Ithaca, N. Y., 460 tons.

Railroad Cooperative Building & Loan Association, Lexington Avenue, New York, 900 tons.

Mutual Potteries Co., Trenton, N. J., several small buildings, 300 tons.

Hospital, Reading, Pa., 250 tons.

Italian Savings Bank, New York, branch at Spring and Lafayette Streets, 1200 tons; also one at 116th Street, 100 tons.

Pathology building for Rockefeller Institute, Princeton, N. J., several hundred tons.

High school building, Roslyn, L. I., tonnage not stated.

General Baking Co., building on Flatbush Avenue, Brooklyn, tonnage not stated.

State Hospital, Norwich, Conn., addition, 250 tons.

Boston & Albany Railroad, new station at Springfield, Mass., tonnage not stated.

New Palmer House, Chicago, 17,000 tons, bids on steel to be received Feb. 1.

Ford Motor Co., steel mill, River Rouge, Mich., 15,000 tons, bids in.

J. L. Hudson store. Detroit, 5500 tons.

Roosevelt high school, Chicago, 3000 tons.

Hotel Congress, Chicago, addition, 3000 tons.

Midwest Refining Co., power house, Casper, Wyo., 500 tons.

U. S. Engineers' Office, Florence, Ala., power house at Wilson Dam, Muscle Shoals, 350 tons, bids close Feb. 7.

Cattle barn, State Fair Grounds, Columbus, Ohio, 300 tons, bids close Jan. 30.

Knights of Columbus building, Columbus, Ohio, 550 tons, bids close Feb. 4.

Louisville & Nashville, bridge work, 1950 tons, bids extended for one week; warehouse at New Orleans, 1300 tons, awards deferred and plans may be altered for reinforced concrete.

Mack Motor Truck Co., service station, Brighton, Boston, 200 tons.

Apartment building, Eighteenth and Chestnut Streets, Philadelphia, 300 tons.

Libbey Owens Sheet Glass Co., Toledo, factory, all bids rejected, plans to be revised.

Stern & Mann, store, Canton, Ohio, 300 tons.

High school, Clairton, Pa., 300 tons.

RAILROAD EQUIPMENT BUYING

Orders for 4277 Cars and 73 Locomotives—Export Business

Of 4277 cars ordered in the past week 1200 were for Australia and of 73 locomotives 16 were for Canada. Unfilled orders of locomotive shops, according to the Department of Commerce, were 387 at the end of December, compared with 691 a month previous. Shipments of locomotives amounted to 3189 in 1923 and 1274 in 1922. Among the week's items are the following:

The Seaboard Air Line is expected to place orders this week for 932 flat car bodies.

The American Car & Foundry Co. has received an order from the Australian State Railways for 1200 cars of miscellaneous types.

The Canadian Pacific Railroad has ordered 16 large locomotives from the American Locomotive Co.

The Southern Pacific has placed 3057 new refrigerator cars for the Pacific Fruit Express as follows: 957 cars to the Pacific Car & Foundry Co., 800 to the Standard Steel Car Co., 800 to the Pullman Co. and 500 to the General American Car Co.

The Louisville, Henderson & St. Louis has placed 20 ballast cars with the American Car & Foundry Co.

The Northern Pacific has let 1000 steel underframes to the Western Steel Car & Foundry Co.

The Great Northern has ordered 8 dining cars from the Pullman Co.

The Chicago & Alton has placed 2 de luxe passenger trains with the Pullman Co., including 4 coaches, 6 parlor cars, 2 observation and lounge cars, 2 dining, 2 mail and 2 combination smoking and baggage cars.

The Santa Fe has ordered 57 locomotives from the Baldwin Locomotive Works, including 10 Pacific type, 6 Mountain type, 15 Santa Fe type and 26 Mikado engines.

An inquiry from China calls for 200 gondola cars.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
		Electro-	New	New	St.	New	St.
Jan.	Lake	lytic*	York	York	Louis	York	Louis
9	13.00	12.50	48.30	8.25	7.95	6.77½	6.42½
10	12.87½	12.37½	48.12½	8.25	8.00	6.77½	6.42½
11	12.87½	12.37½	48.50	8.25	8.00	6.75	6.40
12	12.87½	12.37½	49.00	8.25	8.00	6.75	6.40
14	12.75	12.25	48.87½	8.25	8.00	6.72½	6.37½
15	12.75	12.25	49.50	8.25	8.00	6.70	6.35

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Jan. 15.

The copper market has declined, with demand very light. Buying of tin has been heavy and prices are considerably higher. The lead market continues strong, with the metal scarce. A reaction has set in in the zinc market and prices are lower. Antimony continues high and hard to get.

Copper.—Weakness in the electrolytic copper market has continued to develop further and metal for first quarter delivery is now quoted by most producers at 12.25c., refinery, or 12.50c., delivered. Demand is, however, light so far as actual business is concerned, but in the last day or two considerable inquiry has appeared, involving several million pounds. There has been some business done for export, but this phase of the market is still dormant. The fact that the pound sterling recovered considerably today and the better prospects for some solution to Europe's difficulties are factors regarded as strengthening the market, at least temporarily. Lake copper is quoted at 12.75c., delivered.

Tin.—The week has been one of the heaviest in actual sales for some time. For the week covered by this report it is estimated that at least 1750 tons changed hands. It develops that on Monday, Jan. 7, or a week ago yesterday, 600 tons was sold, and up to the close of last week or the week ended last Saturday estimates placed the total sales at over 1800 tons. There were two big days in the week referred to, Jan. 7, when 600 tons changed hands, and Jan. 10, when 400 to 500 tons was sold. There was good business on other days also, and even on Saturday sales of 300 tons were recorded. Consumers did some of the buying, but more than half was trading between dealers. Yesterday transactions involved about 300 tons, but today the market was quiet. About 75 tons of Straits tin was sold today on the Metal Exchange at 49c. Due to the sharp rise in exchange today spot Straits tin was quoted at 49.50c., New York. The London market today was about £9 per ton higher than a week ago, with spot standard quoted at £251, future standard at £252 5s. and spot Straits at £253 5s. Arrivals thus far this month have been 1510 tons, with 9267 tons reported afloat.

Lead.—The principal development has been another advance by the leading interest on Jan. 10 from 7.75c. to 7.90c., New York. Prompt and January lead is practically impossible to obtain, but business is being done for February and March and therefore quotations for these positions virtually make the market. Independent producers are taking business at about 8c., St. Louis, and 8.35c., New York, for February delivery.

Zinc.—The publication of December statistics showing a sharp increase in production of slab zinc and increase in stocks of 5674 tons, together with the sharp decline in exchange recently, has caused the prime Western zinc market to decline. Buyers have also adopted a waiting attitude because of the softening of the market. Prime Western for January or early delivery is quoted at 6.35c., St. Louis, or 6.70c., New York, with a premium of 2½ to 5 points for future position. Demand is exceedingly light and there is not as much prospect for exports as there was. An interesting item in the statistics is the shipment for export of 3024 tons in December, as compared with only 899 tons in November.

Nickel.—Quotations for spot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. Both shot and ingot nickel in the outside market are quoted at 29c. to 32c. per lb.

Antimony.—Chinese metal is still scarce, with wholesale lots for early delivery quoted and sold at 10c. to 10.50c. per lb., duty paid, New York.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 27.50c. to 28c. per lb., duty paid, from such importers as are able to obtain the metal from foreign producers. Quotations from the leading American producer are not obtainable.

Old Metals.—The market continues quiet and values are practically unchanged. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	10.00
Heavy machine composition	10.75
Brass, heavy	8.00
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.00
Lead, heavy	7.25
Lead, tea	6.25
Zinc	5.00
Cast aluminum	18.50
Sheet aluminum	18.50

Chicago

JAN. 15.—Tin, lead and zinc, have advanced. Copper is slightly lower. Futures have been bought at concessions and it is probable that an attractive tonnage for early shipment could be placed under the market. Tin is strong, but trading is confined to dealers, and consumers are notably absent from the market. Lead appears to be in a firm position owing to the absence of stocks and the fact that new demand is immediately felt by the smelters. Some lead, however, has been offered for February delivery at concessions. Zinc is firm, but quiet. Higher prices would seem logical owing to the high cost of ore. As yet, however, the position of the metal seems unaffected. Old metal prices are unchanged. We quote in carload lots: Lake copper, 13.25c.; tin, 50c.; lead 8.25c.; spelter, 6.40c.; antimony, 12c., in less than carload lots. On old metals we quote copper, copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 8.75c.; yellow brass, 7c.; lead pipe, 6.75c.; zinc, 4.25c.; pewter, No. 1, 27c.; tin foil, 33c.; block tin, 38c.; all buying prices for less than carload lots.

Proposed Steel Plant at Shadeland, Pa.

PITTSBURGH, Jan. 14.—The identity of the company which it has been reported will build a steel plant at Shadeland, Pa., and those sponsoring it is still unknown and the only information to be obtained from James Bradley of the Bradley Co., Jones Law Building, Pittsburgh, who is credited with having the construction contract, is that those behind the company are not yet ready to give out a statement. This, Mr. Bradley says, will come in about three months, when it is expected actual construction of the new plant will begin. He denies the report that the project is a revival of one which had been planned for Greenville, Pa., more than a year ago and also a report that the company was to devote itself exclusively to putting upon a commercial basis the manufacture of steel by the catalytic process devised and patented by Robert McKnight of this city. Mr. Bradley rather indicated that scrap would be extensively used.

Building of a city in Shadeland is part of the project, which Mr. Bradley says, will require at least 5000 acres and while Shadeland will probably be the site, it is not a certainty that the plant and city will be located there if a better location is available. Architects and engineers are to look over Nemacolin, Pa., the coal mining community built up by the Youngstown Sheet & Tube Co., to secure ideas as to the construction of the homes of future workmen on the new steel plant.

PERSONAL

C. E. Lesher, editor of *Coal Age*, New York, has resigned to become assistant to President W. K. Field of the Pittsburgh Coal Co., Pittsburgh. Mr. Lesher graduated from the Columbia School of Mines in 1908 and then spent nearly three years in mining and metallurgical work, all the way from British Columbia to South Carolina. He was connected with the United States Geological Survey, beginning with the close of 1910, valuing and classifying public coal lands. In 1915 he succeeded E. W. Parker in charge of coal and coke statistics. In 1917 he was at first statistician for the Peabody-Lane Committee and later director of the Bureau of Statistics of the Fuel Administration, rendering highly valuable service during the Great War. He served on the Central Coal Committee that directed the coal distribution during the 1919 strike, and at the end of that strike left the Government to go with the National Coal Association, where he reorganized its Bureau of Coal Economics, dividing his time between *Coal Age*, with which he had become connected in April, 1920, and his duties in Washington. The weekly coal report of the Geological Survey and the reports on the distribution of coal and coke, as well as the price report, were initiated by Mr. Lesher. He begins his duties at Pittsburgh on Jan. 17. R. Dawson Hall will continue as engineering editor of *Coal Age* and will be in charge of the paper.

C. E. LESHER

Joseph B. Deisher, for 14 years connected with the T. H. Symington Co. at Rochester, N. Y., has resigned as assistant superintendent, effective Feb. 1, to succeed the late Mr. Beckett of the American Malleable Castings Association as field representative, attached to the consulting engineer's office at Albany, N. Y.

A. M. Roper, formerly secretary-treasurer and general manager of the Roper, Harris & Dunn Co., Greenville, Tex., has been appointed general sales manager of the automotive division for the Alvord Reamer & Tool Co., Millersburg, Pa.

W. W. Sebald, formerly assistant general manager of sales with the American Rolling Mill Co., Middletown, Ohio, has been appointed assistant to C. R. Hook, vice-president, in charge of distribution. R. C. Tobb, manager of the Detroit sales office, will be assistant manager of sales, and his place at Detroit will be taken by Newton Pierson, formerly assistant manager of sales in the Detroit district.

W. R. Webster has resigned the position of chief of the gas purification division with the Koppers Co., Pittsburgh, to become assistant chief engineer of the South Side works, Jones & Laughlin Steel Corporation, Pittsburgh. He was for several years assistant chief engineer of the Cambria Steel Co., Johnstown, Pa., and before going with the Koppers Co. had charge of the engineering division for the Semet-Solvay Co., Syracuse, N. Y.

Alexander McIver has been appointed supervisor of heavy traction development for the Westinghouse Electric & Mfg. Co. He has been with the Westinghouse company since 1909. After graduation from the University of North Carolina, he took the electrical engineering course at Johns Hopkins University, finishing in 1895.

Harry J. Kelly, general mill superintendent of the Lackawanna plant, Bethlehem Steel Co., has resigned to accept an executive position with the British Empire Steel Corporation, Sydney, Nova Scotia. He was in the service of the Lackawanna organization 33 years. His first employment was as errand boy in the Scranton mills of the old Lackawanna Steel Co. In his new position Mr. Kelly will be associated with George F. Downs, formerly president of the Lackawanna company.

O. W. Mason, for many years manager of the Philadelphia and New York offices of Hickman, Williams & Co., dealers in pig iron, coke, ferroalloys and scrap, has resigned to engage in business for himself. His plans have not been definitely announced nor has his successor as eastern manager for Hickman, Williams & Co. been named.

R. W. J. Harris has been appointed general manager of the Vermilion Malleable Iron Co., Hoopeston, Ill., to succeed Fred Stiehl, resigned.

R. G. Holmes has been transferred from the Detroit to the Chicago office of the Consolidated Machine Tool Corporation of America. He opened the Detroit office about a year ago and prior to that had eight years' experience with the Newton Machine Tool Works, Philadelphia. A. W. VanBuren and F. T. Scott will continue to represent the company at Chicago. The organization at Chicago will specialize on sales and service in connection with the five lines manufactured by the Consolidated corporation. Other lines which were carried at Chicago will be dropped.

E. E. Welles, heretofore identified with the Scottdale, Pa., works of the United States Cast Iron Pipe & Foundry Co., has been transferred to the Chicago sales office to take the place vacated by G. T. Overholt, recently appointed acting sales agent at New York.

Paul H. Brangs, for many years a director and vice-president of the Heine Boiler Co., 11 Broadway, New York, has retired from business, after 40 years of intensive activity, and will make a trip around the world. He will leave on the steamship Resolute on Jan. 18, and will be absent about six months. He will visit Northern Africa, India, China, Japan, the Philippines and the South Sea Islands. Mr. Brangs began his career with Hiram Maxim, of the United States Electric Co., and later went with the Westinghouse Electric & Mfg. Co. In 1890, he became electrical engineer of the Lackawanna Railroad Co. He became associated with the Heine Boiler Co. in 1901.

P. H. BRANGS

S. P. Hendricks, long associated with the Emerson-Brantingham Co., Rockford, Ill., has been elected president of the Abingdon Mfg. Corporation, manufacturer of automotive bodies and wagons, Abingdon, Ill., to succeed John W. Davis, resigned.

Raymond C. Davis, formerly associated with Manning, Maxwell & Moore, Inc., and with the Fairbanks Co., has associated himself with Hill, Clark & Co., Inc., Boston. He will represent the company in Connecticut, making his headquarters at New Haven. Mr. Davis replaces F. M. Lord.

A. M. Thomson has been appointed Philadelphia district representative of the Hauck Mfg. Co., Brooklyn, N. Y., maker of oil burning appliances, with office at the Bourse, in place of R. Benton Ecker, resigned. Mr. Thomson was previously representative of the company for northeastern Pennsylvania, Canada and New England.

Jonathan Warren, president Trumbull Steel Co., Warren, Ohio, has been elected a member of the board of directors of the American Iron and Steel Institute, to fill the vacancy caused by the death of Willis F. McCook for the term expiring in 1926.

J. R. Camm, formerly connected with the Cleveland sales offices of the Kearney & Trecker Corporation, has become associated with the machine tool sales department of the Cleveland Tool & Supply Co.

A. P. Spooner, who succeeds R. M. Bird as engineer of tests of the Bethlehem plant of Bethlehem Steel Co., has been with the company since 1915 in the metallurgical division. He received the degree of metallurgical engineer at Lehigh University in 1911. After graduation he was employed in the blast furnace department of the Pennsylvania Steel Co., which at that time was carrying on considerable experimental work. In 1912 he went with the Canadian Collieries Co., Ltd., Union Bay, Canada, working in the coal washery and loading plant until 1913. Later he was in the inspection department of the Harrisburg Pipe & Pipe Bending Co. when it was working on shell orders and in 1915 took up work at Bethlehem. Mr. Spooner is a member of the American Institute of Mining and Metallurgical Engineers and the American Society for Testing Materials, and is chairman of the Lehigh Valley chapter of the American Society for Steel Treating.

A. P. SPOONER

M. R. Stowell, for many years sales manager of the American Refractories Co., has joined the staff of the Vitrefrax Co., Los Angeles, Cal., as sales manager of the Western division.

James H. Hammond, chairman Superior Steel Corporation, Pittsburgh, recently was elected president of the board of trustees of the Homeopathic Hospital, that city.

William G. Clyde, vice-president and general manager of sales for the Carnegie Steel Co., Pittsburgh, recently was elected a director of the Bank of Pittsburgh.

A. F. Harvey, whose election as president and general manager of the Pittsburgh Steamship Co., subsidiary of the United States Steel Corporation, was noted last week, graduated from Yale University in 1893. In the following year he obtained employment in the general offices of Pickands, Mather & Co., Cleveland. Two years later he was transferred to the office of Harry Coulby, whom he now succeeds. At that time Mr. Coulby had charge of the firm's boats, docks and ore shipments. Mr. Harvey went to the Steel Corporation when it was organized in 1901, as assistant to A. B. Wolvin, vice-president and general manager of the Pittsburgh Steamship Co., with offices in Duluth. In 1904 Mr. Coulby succeeded Mr. Wolvin as president and general manager of the steamship company and Mr. Harvey then became assistant general manager and his office was moved to Cleveland. For many years he has had active charge of the Pittsburgh Steamship Co.'s lake fleet of 99 boats.

A. F. HARVEY

H. W. Brooks, formerly construction engineer with the Chicago, Aurora & Elgin Railroad, has been appointed fuel engineer of the bureau of mines, succeeding John Blizard. Mr. Brooks was formerly located in Pittsburgh, having been connected with the Westinghouse Electric & Mfg. Co. from 1911 to 1915.

C. H. Tinker has resigned as assistant manager of sales in the Eastern district, in charge of the Boston office of the Republic Iron & Steel Co., Youngstown, Ohio, to go into business for himself. His successor is Norman W. Foy, who has been transferred from the company's Buffalo office. Allan Hills, who has been Canadian sales representative, with headquarters in Toronto, goes to the Buffalo office as manager of sales for that district. Canadian business of the company, hereafter, will be handled through the Buffalo office.

William B. Topping, general sales manager Republic Iron & Steel Co., started Jan. 14 on a business trip to California.

Samuel L. Smith, vice-president National Malleable Castings Co., and E. J. Kulas, president Midland Steel Products Co., Cleveland, have been elected directors of the Union Trust Co., that city.

W. A. Donald, formerly factory manager of the Deep Drawn Metal Corporation, 61-67 Navy Street, Brooklyn, will have charge of the plant of the Vitreous Enamel & Stamping Co., 1381 Sedgewick Avenue, New York.

Stanley H. Bullard, of the Bullard Machine Tool Co., Bridgeport, Conn., writing as president of the Connecticut Chamber of Commerce in the *Financial Digest*, describes the outlook for the Connecticut business man for 1924 as "decidedly pleasant and satisfactory."

Clarence M. Ballou, for seven years manager of the Cleveland plant of the American Sheet & Tin Plate Co., has been appointed City Traction Commissioner under the new city manager in Cleveland.

J. K. Larkin announces his resignation as president of J. K. Larkin & Co., Inc., New York. The company was organized by Mr. Larkin 23 years ago and under his direction has steadily grown to its present proportions. He has been actively associated with the steel industry for 32 years.

J. K. LARKIN

R. J. Whelan has been made general manager for the Ohio Nut & Bolt Co., Berea, Ohio.

Hugo Diemer of the La Salle Extension University was a guest of honor at a dinner given at the Union League Club, Chicago, Dec. 27, on the occasion of his appointment as a lieutenant-colonel in the Ordnance Department of the United States Army.

A. L. Jenkins, professor of mechanical engineering at the University of Cincinnati, was recently commissioned major in the Ordnance Department.

W. C. Stevens, general sales manager Cutler-Hammer Mfg. Co., Milwaukee, since 1917, has been made director of developments for all departments. He is a graduate of Cornell University, entered the employ of the company in the student engineering course in 1906, and since has been successively in the engineering department, head of steel mill sales engineering work, district manager of the Chicago, Boston, and New York offices. Mr. Stevens is also a member of the board of directors. His successor is G. S. Crane, who has been with the company since graduation from the University of Michigan in 1910. He has been manager of the Cleveland office and during the last three years has been manager of controller sales at the main office.

Noah G. Klove, who has been actively engaged with the Sherman-Klove Co., Chicago, maker of nuts and screws, as an officer and assistant manager for several

years, has disposed of his interest in the company and will end active participation in its affairs Jan 31.

Charles M. Schwab, chairman Bethlehem Steel Corporation, sailed for Europe on the Majestic, Jan. 12, bound for London and Paris, to be gone not longer than a month. Business matters came up unexpectedly and made the departure a hurried one.

Charles D. Terry, who has been connected with National Tube Co. since 1897, and since 1911 has been located at the general office, Pittsburgh, as assistant to the general superintendent, has resigned to become vice-president of the Boss Mfg. Co., Kewanee, Ill.

Camille Cavallier, president of the Société des Hauts Fourneaux et Fonderies de Pont-à-Mousson, was presented a gold medal at a banquet in Paris on Dec. 8 of the national committee of advisers of foreign commerce as "a pioneer of French development and the one who, more than anyone else, has contributed to the development of our foreign trade." Besides his connection with the Pont-à-Mousson works covering half a century, he is a member of the executive committee of the Comité des Forges, the association of iron masters of France, and is president of the Société des Fonderies de Bayard et Saint-Dizier, vice-president of the Micheville steel works, representative of the Pont-à-Mousson works on the directorate of the Rombas works in Lorraine and a director of the D'Allevard works in Isère and of the Compagnie des Forges et d'Acieries de la Marine et Homecourt.

C. H. Davies, formerly manager of the Chicago branch factory of S. F. Bowser & Co., with which he has been connected for several years, has assumed charge of the factory sales promotion division of the entire organization, with headquarters at Fort Wayne, Ind. He relieves L. E. Porter, assistant general manager, of the promotion work, and will collaborate with T. D. Kingsley, general sales manager.

Ralph O. Mullen, who has been connected with the home office of the W. W. Sly Mfg. Co., Cleveland, for several years, will assist C. P. Guion, Chicago district manager, and E. T. Williams has been added to the force in the Cleveland territory. H. P. Furlong, who has been connected with foundry work for 15 years, will assist D. P. Carter in the New York territory. H. R. Atwater, formerly sales manager of the Osborne Co., will represent the Sly company on the Pacific Coast.

Philip L. Smith, formerly with Naylor & Co., Inc., New York, continuously for 20 years, has relinquished his interests in William H. Mills & Co., Inc., to assume the management of the ore and metal department of H. Hollesen, Inc., importer and exporter, 44 Beaver Street, New York.

Dr. Thomas T. Read, supervising mining engineer of the U. S. Bureau of Mines, has been awarded a gold medal and a commemorative diploma by the government of Brazil.

Negotiations are in progress for the purchase by a new subsidiary of the Massachusetts Gas Co., Boston, of the Crowell & Thurlow Steamship Co. fleet of nine vessels. The new subsidiary will be known as the Mystic Steamship Co., the stock of which is to be owned by the New England Fuel & Transportation Co., which, in turn, is owned by the Massachusetts Gas Co., which also owns the New England Coal & Coke Co. The Massachusetts Gas Co. contemplates the erection of a blast furnace at Everett, Mass., at some future date. If the Crowell & Thurlow boats are purchased, they would be used in part for the transportation of raw materials for the furnace, as well as for the transportation of coal.

Dr. Charles Burton Thwing, president, Thwing Instrument Co., Philadelphia, will be the speaker at the regular monthly meeting of the Pittsburgh Foundrymen's Association, to be held at the General Forbes Hotel, Monday evening, Jan. 21. His subject will be, "The Use of Pyrometers in the Foundry."

OBITUARY

WILLIAM K. HERZOG, who was consul at Zittau, Germany, under the McKinley and Roosevelt administrations, died of diabetes recently at his home in St. Louis, after an illness of four weeks. Mr. Herzog was born at Cafel, Switzerland, in 1864 and was educated in Swiss seminaries and at Heidelberg, Germany. When a young man he came to America and settled in St. Louis. President McKinley sent him to Zittau in 1897 and the appointment was renewed by President Roosevelt. He returned to St. Louis in 1902 and joined the engineering staff of the National Enameling & Stamping Co., at Granite City, remaining there until about three years ago, when he became a special sales representative of the West Virginia Coal Co.

ARTHUR NEWMAN HOLLY, vice-president A. G. Leake Erecting Co., Bridgeport, Conn., died Jan. 2, at the Bridgeport Hospital. He was born in Stamford, Conn., 55 years ago. In 1915 he went to Bridgeport and with Arthur G. Leake organized Leake company, with which he has since been active in steel construction.

WILLIAM HOOPES, chief electrical engineer of the Aluminum Co. of America, Pittsburgh, since 1900, died at his home in that city on Jan. 9. Besides having charge of electrical engineering, he also had been head of the research and technical departments during the past seven years. Mr. Hoopes was born in West Chester, Pa., in 1867, and was graduated from Lehigh University with the class of 1886.

ARTHUR M. WHITE, superintendent American Locomotive Co., at Schenectady, N. Y., for 20 years, died Jan 13, at Manchester, N. H., aged 78 years. Mr. White had charge of the old Bloods Locomotive Works at Manchester for 12 years, and reorganized the Cooke Locomotive Works at Paterson, N. J.

C. H. COLE, president United Iron Works, Kansas City, Mo., died in that city of hardening of the arteries, Jan. 4.

Bookings of Steel Castings in December and 1923

WASHINGTON, Jan. 15.—The Department of Commerce announces that December bookings of steel castings, based on reports from principal manufacturers, and representing over two-thirds of the commercial castings capacity of the United States amounted to 41,098 tons, as against 39,660 tons in November. Total bookings for 1923 amounted to 868,019 tons, or 74.6 per cent of capacity, of which 380,000 tons were railroad specialties and 488,019 tons were miscellaneous castings. Bookings for 1922 totaled 785,059 tons, or 67.5 per cent of capacity, of which 399,174 tons were railroad specialties and 385,885 were miscellaneous castings.

The following table shows the bookings of commercial steel castings for the past 12 months by 65 identical companies, with a monthly capacity of 96,900 tons, of which 38,300 tons are usually devoted to railroad specialties and 58,600 tons to miscellaneous castings.

	Total		Railroad Specialties		Miscellaneous Castings	
Month 1923	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity
January	100,605	103.8	47,879	125.0	52,726	90.0
February	90,152	93.0	39,845	104.0	50,307	85.8
March	143,564	148.2	76,409	199.5	67,155	114.6
April	90,968	93.9	39,610	103.4	51,358	87.6
May	89,493	92.4	38,788	101.3	50,705	86.5
June	84,878	87.6	42,773	111.7	42,105	71.9
July*	52,066	53.7	16,741	43.7	35,325	60.3
August	50,515	52.1	18,332	47.9	32,183	54.9
September	47,574	49.1	21,685	56.6	25,889	44.2
October	37,446	38.6	9,840	25.7	27,606	47.1
November	39,660	40.9	12,916	33.7	26,744	45.6
December	41,098	42.4	15,182	39.6	25,916	44.2

*Two companies with a capacity of 785 tons per month on miscellaneous castings now out of business.

Electric Furnace Phenomena

(*Continued from page 227*)

furnace or the burning of the refractory anywhere within the furnace is a function of the power introduced into the furnace and the distance which the arcs are from such refractories. In the furnace under test the nearest portion of No. 2 electrode is about 18 in. from the back wall and the nearest parts of No. 1 and No. 3 electrodes are 19 in. from the nearest wall. In practice, however, the No. 2 electrode affects the back wall refractories more than No. 1 and No. 3 affect the refractories opposite them. It is, therefore, good practice to set the contact-making ammeters of the furnace regulator to a lower value for No. 2 position than for No. 1 and No. 3 positions. This has a tendency to introduce less power into No. 2 position and therefore the greater burning action of No. 2 electrode is counteracted. The furnace under test has sufficient connected capacity for satisfactory work and any attempt to introduce more power into it would only punish the refractories unnecessarily and cut down their life materially. It is possible, however, to bring all three electrodes closer together, thereby increasing the distance of the arcs from the refractory walls. Under these conditions it would then be possible to increase the connected capacity from 1,500 kva., the present amount, to 2,000 kva. This closer concentration of the electrodes toward the center has recently been accomplished by the American Bridge Co. in their latest furnaces where the electrodes are placed on a center of 34 in., thus providing a clearance of 27 in. from nearest portion of electrodes to wall, or an increase of about 9 in. By using 2,000 kva. capacity in transformers, a much faster melting furnace can be secured and less damage to the refractories will occur than with present types.

10. What is the limiting capacity of electric furnaces?

Results: This question is intended to mean the largest amount of power which can be introduced into a furnace, since the size and capacity of a furnace will be limited by the amount of power it is possible to deliver within it. In carrying large amounts of power into a furnace the amplitude of the fluctuations will increase as the amount of power increases. Under these conditions, therefore, it is necessary to have the total reactance of such value as to prevent the fluctuations from causing disturbances on the power company's lines. In doing so, the amount of power may be reduced to such an extent as to slow up melting of the charge, in which case the production of the furnace will be greatly curtailed. From a study of present furnace installations it would appear that a 25-ton furnace with a capacity of 4500 kva. on a 25-cycle circuit, is about as large as should be installed when melting is done and where only one set of electrodes is used. For hot-metal work a furnace of 40 tons capacity with a connected load of 3300 kva. is very satisfactory, using one set of electrodes of 24 in. diameter. Since commercial electrodes are not available in sizes above 24 in. diameter, and since it is not expedient to raise the present electrode current densities to a higher value, capacities above 40 tons using one set of electrodes are probably not advisable at this time. In 60-cycle circuits where melting is done, using only one set of electrodes, furnaces beyond 15 tons capacity are not recommended, but for hot-metal work a furnace of 40 tons capacity is satisfactory. By using more than one set of electrodes, it is possible to build a furnace of several hundred tons capacity.

11. Is 25-cycle current more desirable for electric furnaces than 60 cycles, or vice versa?

Results: Twenty-five-cycle current suffers less impedence in a conductor than 60 cycles and this is, of course, the reason why more reactance must be used with 25 cycles than with 60 cycles. It is also possible to introduce a greater amount of 25-cycle power into a furnace, this feature being discussed under question No. 10. For furnaces of a given capacity, say 6 tons, similar to the one under test, it is impossible to state which of the two frequencies will be more satisfactory. It would appear that 60-cycle arcs have greater tenacity than 25-cycle arcs, in which case the 60-cycle arc would be maintained, under conditions of regulation, for a greater length of time than with 25 cycles. This would allow the 60-cycle arcs to persist for a greater length of time and, therefore, with greater power input into the furnace than with 25 cycles. There also seems to be an impression that 60-cycle arcs have less cutting action on the refractories than 25-cycle arcs, but this cannot be substantiated, as it is impossible to make adequate comparisons unless the furnaces are operating side by side under exactly the same characteristics and conditions, save that of frequency. As both 60-cycle and 25-cycle power for furnace operation does not exist anywhere in the same plant, to our knowledge, proper comparison between the frequencies connot be made. It is planned, however, in the near future to run a series of tests covering this subject upon the same furnace used in these present tests, it being possible to make arrangements with the local power company to provide for a limited length of time sufficient 60-cycle power to operate another furnace of identical capacity and characteristics side by side with the one under test. It is proposed to use the present bank of three 500 kva., 25-cycle transformers, which have a reactance of 5 per cent on 25 cycles. When operated on 60 cycles this bank would have a reactance of 9.4 per cent, the iron losses would be reduced somewhat on 60-cycle operation and the copper losses increased. The total losses of the transformers, however, would be the same on both frequencies. With the same applied primary voltage in each case, the secondary voltages would probably be near enough together to give comparable results. This secondary voltage would be lower on the 60-cycle operated furnace, which would reduce the length of the arcs slightly and favorably affect the operation of this furnace, particularly as regards refractories. The regulation at full load on 60 cycles at 120 volts and 90 per cent power factor would be 6.3 per cent, which, of course, is not so satisfactory as on 25 cycles, but for test purposes should not interfere with results.

12. A central station cites an instance during the war where certain Government experts claimed that higher temperatures could be attained in 60-cycle furnaces than in 25-cycle.

Results: Data are not available which substantiate this contention. One kwh. of electricity is capable of being transformed into 3415 B.t.u. and, whether the current is an alternating one of 25 cycles or 60 cycles, or a direct current, does not change the thermal effects. The type and resistance of the current-carrying material determines this.

13. Secure the power factor of the furnace circuit at the time of short circuits.

Results: Chart 4 indicates that at heavy loads the power factor goes up. Also the value of power factor, at the time of short circuit, when all electrodes are shorted in the bath, is higher, being due to the large load, which is largely non-inductive—a resistance load.

15. Determine if other power services supplied from the same circuit as the furnace are affected.

Results: To secure this it was necessary to have meters in other consumers' premises and connected to the same furnace circuit. These meters indicated no large disturbance beyond a momentary swing in voltage when the furnace load came on. These voltage variations were of only average magnitude—not over 4 per cent.

16. Will the magnitude of a power surge be different for various capacity transformers?

Results: No. The load taken by the furnace and the amount of reactance in the circuit determine surges or fluctuations. A transformer of 2000 kva. capacity with same characteristics and reactance as a 1000-kva. unit will not increase the number or magnitude of surges.

18. In charging cold scrap, what is the general effect of short circuits on power systems, and is this compensated for by adding reactance?

Results: Short circuits, such as occur in a furnace, do not generally take place across all phases at once, although at times all phases may be shorted. Some unbalancing occurs, but it is not sufficient to cause the slightest trouble on a power system of adequate capacity. Obviously, a very small plant would have difficulty in maintaining satisfactory service where the furnace load was a large percentage of the total capacity, say over 30 per cent.

19. What capacity circuit breakers should be used for electric furnaces, and also the capacity of the supply lines?

Results: Circuit breaker capacity should be based upon the value of the total kva. which can be concentrated at the terminals of the transformers, and not entirely upon the load to be carried by the furnace. This means that in large systems supplying power to furnaces the breakers should be larger than in small systems, for the same capacity furnace. As indicated previously, the maximum short-circuit current through the furnace and transformers was found to be in these tests 3.66 times normal. However, this condition is abnormal and in regular operation the current would not exceed twice normal. As there is the possibility of a short circuit on the lines, however, the breakers should always be of sufficient capacity to interrupt the current which will flow into the short.

20. Results: The ambient temperature averaged 24 deg. Cent. and the average temperature of the transformer bank was 42 deg. Cent., which is a temperature rise of 18 deg. Cent. above the ambient temperature. The transformers, therefore, during the entire series of tests, were operating at a safe temperature.

23. What are the relative merits of high-speed electrode travel versus low-speed and the effect on load factor, rapidity of melting, and power fluctuations?

Results: The electrodes were operated at various speeds

of travel. These changes in speed were accomplished by changing the value of resistance in the electrode motor circuit, it being possible with a series of short-circuiting switches to throw into or out of circuit any number of resistance units. It was found that a relatively high speed of electrode travel was desirable and resulted in re-establishing the arc, after it had been extinguished by the fusing of a portion of scrap, much sooner than with slower electrode travel. This means that faster melting will be secured and also a somewhat higher load factor.

24. Determine if opening charging doors of furnace has any effect, such as causing arcs to be extinguished.

Results: The arcs in a furnace can never be extinguished by merely opening the charging doors and any impression to the contrary is probably caused by other influences, such as slag conditions.

25. Secure the length of time required for a bath of steel to freeze after power has been cut off.

Results: This will depend entirely upon the temperature of the bath at the time power is cut off. If the bath has been brought up to its full temperature it should take between 2 and 3 hr. to freeze, but the steel, of course, under these conditions would be unfit for use. The greatest length of time for which power could be interrupted and not injure the steel would depend on how far the melting of the scrap had progressed. With the bath molten or nearly so, the power could not safely be interrupted for longer than ¾ hr.

Cooling Water Data

	Average Temperature Cooling Water Incoming		Average Temperature Outgoing Water		Temperature Rise of Water		Gallons of Water	Kwhr. Lost
Heat No. 14612	Deg. C.	Deg. Fahr.	Deg. C.	Deg. Fahr.	Deg. C.	Deg. Fahr.		
Melting	20	68	36	97	16	29	539.34	37.95
Refining ...	21	70	39.5	103	18.5	33	157.84	12.84
Charging ..	20	68	35	95	15	27	78.92	5.21
Total							776.10	56.00
Heat No. 14616								
Melting	20	68	37	98.5	17	30.5	641.08	47.92
Refining ...	20	68	36	97	16	29	159.33	11.21
Charging ..	20	68	35.5	96	15.5	28	79.66	5.61
Total							880.07	64.74
Heat No. 14620								
Melting	20	68	36.5	97.5	16.5	29.5	486.23	35.28
Refining ...	20	68	37	98.5	17	30.5	130.91	9.79
Charging ..	20	68	36	97	16	29	65.45	4.64
Total							682.59	49.71

26. Investigate rectifying effect of the arc.

Results: An indicating millivolt meter showed a value of 5 millivolts. A recording millivolt meter was used, although the chart of this meter shows a very great fluctuation from zero to 5 millivolts. The indicating meter also showed reversals of the current.

30. Results: When integrating watthour meters are connected to the primary side of the transformers supplying the furnaces, these meters are accurate within commercial limits.

When meters are connected to the secondary side there is no doubt that serious errors in registration would result, due to presence of direct current caused by rectification in the arc, and consequently the current wave shape would be unsymmetrical. Current transformers have large errors where the wave shape is unsymmetrical and, therefore, integrating meters connected to them would have sufficient errors to exceed commercial limits.

Appendices

To have an approximate idea of the temperatures outside the furnace, a number of tests have been made with indicating thermometers and the average temperature values secured are as follows:

Shell top of furnace	99.5	deg. Cent.
Electrode holders	46	deg. Cent.
Electrode at extreme top	57	deg. Cent.
Air in building	31	deg. Cent.

Cooling Water Used for Electrode Holders and Roof Rings

Cooling water is used on an electric furnace about the electrode holders and roof glands or rings, to prevent burning out these members by the intense heat and flame emanating from within the furnace. It is generally customary to pipe No. 1 position of electrode holder and No. 1 roof ring together in series so that each position has an independent source of cooling water.

To determine the amount of water used for cooling a furnace, a suitable water meter was installed in the 2-in. diameter incoming water line and a thermometer arranged to indicates its temperature. The results are tabulated at left and are made up from figures obtained during the tests.

To obtain results which would not be under test conditions, data were secured covering operations over a period of one month and the following may be taken as an average during this time:

Average Cooling Water Requirements

Gallons Melting Period	Gallons Refining Period	Gallons Total Heat	Gallons Charging Period	Gallons Total	Average Temperature Incoming Water Deg. Cent.	Average Temperature Outgoing Water Deg. Cent.	Temperature Rise Deg. Cent.	Kwhr. Lost
786	189.5	975.5	93.5	1069.0	20	37	17	79.91

From the tables it will be noted that from 49.71 to 64.74 kwhr. were lost in the cooling water during the special tests and during the month an average of 79.91 kwhr. With power at 0.01c. per kwhr. the monetary losses per heat as shown by these figures would be 49.7c., 64.74c. and 79.71c., respectively. These losses represent 6.6 per cent, 8.6 per cent and 10.6 per cent losses, based on 750 kwhr. per net ton of steel produced.

Electrode Resistance Losses

It can be expected, however, that electrode losses at full load will not be less than 10 per cent, where 17-in. diameter electrodes are used, and will generally be much more than this. In figuring the overall losses throughout a heat, and with electrode holders at varying positions on the electrodes, as would obtain in regular production, the losses will be approximately 10 per cent. Using 750 kwhr. per ton of steel melted and refined, the electrode losses would, therefore, be at least 75 kwhr. and with power at 1c. per kwhr., the monetary loss per hour of operation would be 75c.

Aluminum in 1923

The output of aluminum in the United States was larger in 1923 than in 1922, owing to the increased demand for aluminum by makers of automobiles and utensils, according to estimates issued by the Department of the Interior through the Geological Survey. In 1922 the domestic output was valued at $13,622,000. The large increase in demand is indicated by the fact that the imports of crude and alloy aluminum during the first nine month of 1923 were 1,500,000 lb. greater than in the same period of 1922, whereas the exports were only one-third as large.

Aluminum, 99 per cent pure, was quoted at 22c. to 23c. per lb. at the beginning of the year, but the price increased at the rate of about 1c. a month, so that by April quotations were 27c. and in June 27.50c. per lb. In the last half of the year quotations were steady at 26c. to 27c. per lb. Foreign aluminum was sold at prices 2c. to 3c. per lb. lower than those for similar domestic grades.

The South Australian Harbors Board, a department of the State Government of South Australia, is inviting tenders to supply the board with two 10-ton and one 15-ton traveling cranes at the port of Adelaide. The Industrial Machinery Division, Department of Commerce, in making this announcement, says that the tenders may be alternately for steam driven or self-contained electric driven cranes, each to be provided with a central control of the most efficient type, to be controlled by one operator and to run on a track of 63-in. gage. Copies of the detailed specifications may be seen at the New York and Chicago district offices.

Working hours in Switzerland should be increased from 48 to 52 per week, it is the belief of the Swiss Government, and a national plebiscite on the question will be taken Feb. 17. Meanwhile, the Fischer Steel Works at Staffhausen has been permitted to make the change, which affects 2200 men.

Two Cabinet Members Fail to Agree

(*Continued from page* 221)

in enforcing the anti-trust act. But, of course, as to what activities and how far you will cooperate with trade associations, are matters for your determination in conducting your department."

The Attorney-General said that he can see no objection to information mentioned by Mr. Hoover being gathered by an association, provided it be strictly guarded and the association be prohibited from distributing it among its membership, and its distribution be required through a responsible medium like the Department of Commerce.

"This is the same view that I entertained when the communications were exchanged in February, 1922," said the Attorney-General, "and it has since been strongly confirmed by decisions of the Supreme Court and by investigations of a number of associations and the trial of cases involving associations."

Mr. Hoover, in February, 1922, asked about the right of trade associations to collect statistics from each member showing his volume of production, capacity, wages, consumption, distribution and stocks, and of the association to compile the information in a consolidated statement. Mr. Hoover also inquired if the combined information is not given to any other person, it could be filed with the Secretary of Commerce for distribution to members and the public generally; wether at the same time the association could have its members report the prices they have received, specifying volume of each grade, brand, etc., and the price received for the volume sold in each respective district; whether the association, without making known to any person the individual price reports of any member, consolidate all of the reports into one and show the average price for the total volume and whether after making such a compilation the association could report to the Secretary of Commerce for distribution to the public and to any person or all persons who may be interested in the particular industry making the reports.

Secretary Hoover's Position

It was maintained by Mr. Hoover that the question as to the right of trade associations to gather and distribute information and statistics is becoming more and more acute and he expressed the view that the collection and distribution of current unidentified information and statistics as to production, stocks on hand, and prices on closed transactions should be permissible providing that it is all made available on fair terms, not only to the association members, but to all others interested, including the general public.

The Attorney-General would not only limit distribution of the information suggested to a "responsible medium, like your department," but disagrees with Mr. Hoover as to the right of giving out information on closed transactions among members through associations and to the public generally.

"Those who organize and conduct these associations appear to entertain the idea that if the information imparted relates only to past and closed transactions, there can be no violation of the anti-trust act," said Mr. Daugherty. "In my judgment, such an idea is wholly fallacious. One's future conduct is to be judged by what he has done and is then doing, and not so much by what he says he will do. It is one's actual conduct that is taken as an example for imitation. It has developed in the trial of cases involving associations that the members first agree upon prices; but such a plan did not work because the members could not be relied upon to keep the agreement; and the system of exchanging statistics was adopted because it was found to be the only effective way to procure cooperation as to prices and production; and such cooperation could be thus procured even in the absence of any positive agreement.

"Again the idea seems to be prevalent that no exchange of information between the members, regardless of its character, can be unlawful if at the same time publicity be given thereto through the press or some governmental agency. In my judgment, this idea is likewise fallacious. The illegality as well as the evil results arise from the cooperation among the members pursuant to a positive or tacit understanding; and this cooperation is not affected by publicity. Those who purchase the commodity, though fully informed as to the activities of the association, can protect themselves only by organization and cooperation of like character, which, if it were lawful, is an impossibility upon the part of the public."

The Hoover Plan of Cooperation

The Attorney-General was informed by Mr. Hoover that, predicated principally upon Mr. Daugherty's informal reply in February, 1922, the Department of Commerce formulated a plan of cooperation with trade associations under which the association's secretary collects and compiles unidentified current information and distributes it to the members simultaneously, sending identical reports to the governmental agencies, competitors of the association's members, and to any other person who arranges for them, there being no supplemental or separate reports transmitted to members only. The department publishes the reports.

The Secretary of Commerce said, however, that he interpreted the tile decision to mean that it would be unlawful for the association on behalf of its members to transmit information as to production, shipments, stocks on hand and prices, to its members, but that the association could receive and compile the information for the purpose only of transmitting it to a governmental agency that might so request. The Secretary pointed out that it was his understanding that this decree is only binding between the parties involved, but in view of informal conversation between representatives of the Department of Justice and the Department of Commerce, he is inclined to be of the opinion that the decree expresses a policy of the Department of Justice relative to the collection, compilation and distribution of information and statistics of the character mentioned applicable to trade associations in general. The Secretary said that it is not the desire or purpose of the Department of Commerce to continue operations under the cooperative plan if it is in conflict with the policy of the Department of Justice, but that he desired to call the attention of the Attorney-General to the situation which will develop, in the opinion of the Secretary, if his interpretation of the decree correctly expresses the policy of the Department of Justice.

Mr. Daugherty said that the proviso in the tile decree prohibiting the distribution of the information as to production, shipments, stocks on hand and the prices of tile among association members but permitting collection of such information for the Government, complies strictly with paragraphs quoted from Mr. Hoover's letter of Feb. 3, 1922. The decree permits distribution of sales information annually for purposes of assessment of members of the association.

Two Objects in Mind

"Two objects were had in mind during the conferences which preceded the above mentioned correspondence," said the Attorney-General, "both of which it was thought were secured by the limitations embraced in the above quoted paragraphs of your letter: First, that the information distributed should be general, and, second, that individual contact between those engaged in the same industry with reference to matters which

vitally affect prices should be avoided. If the character of the information and the manner of its dissemination be restricted as specified in your letter, one member would not be informed as to the individual activities of another member, and those engaged in the industry would be prevented from revealing their business to their competitors. Under the system now practiced by many of the associations, each member reports its production, shipments, stocks on hand, and each individual sale, stating the price at which it is made and, generally, the locality where made; and this information is distributed by the secretary or manager of the association among all the members, though in some associations the names of the members making the sales are omitted. Thus each member reveals the details of his entire business to every other member, which, as suggested by the Supreme Court in the Hardwood case, is entirely inconsistent with the normal attitude of real competitors.

"In my judgment the effect of general information as to the conditions of an industry, such as the total production, shipments, stocks on hand and the average price, or range of prices, is entirely different from that resulting from each person engaged in an industry receiving directly, or through a common medium, reports which reveal to him the exact condition of the business of all his competitors. When thus informed, each one is invited, and is naturally inclined, to imitate the conduct of his most successful competitor; and the spirit of comradeship created by the confidential exchange of information of this character necessarily prevents the free competition between them which would otherwise prevail."

It is reported that the Attorney-General may in the near future make a further statement as to the attitude of the Department of Justice concerning the question of trade associations with the hope of finally bringing to a permanent end discussion of the matter.

Management in the Public Interest

(*Continued from page* 215)

the railroads and many public utilities. A suggestion has been made that the financial interests could, if they would, exert a powerful effect in enforcing the best management in industry, and this suggestion is worth considering.

Where the Banks May Help

Every industry, at one time or another, finds it necessary to borrow money. The banks lend to or finance an enterprise on the basis of a financial statement showing assets and liabilities, volume of business in a given period, volume of orders on hand, and such other items as the bankers may desire. Such a statement, while showing the financial status, gives no indication of the ability of the management, except that it has been able to make profits in the past. Under certain conditions, and with no competition, the worst-managed business in the world can make a profit. The financial statement does not show what a particular business would do were the present conditions to change. Such a change might convert what appears to be a very good loan into a grave risk. With good management, which includes accurate forecasting of business conditions, careful purchasing, adequate control of labor, and maximum productivity of equipment, the risk is minimized or non-existent. The banker is entitled to and should demand information regarding these features of a business before loaning it money. On the basis of such a statement, of two industries, each of equal worth according to their financial statement, the one showing the best managerial statement should receive the preference.

A beginning has been made in this respect. Certain investment bankers have arranged with engineering organizations, whose managerial ability is unquestioned, to undertake the management of properties in which they are financially interested. A prerequisite to financial assistance is the agreement that the management of the enterprise be under the supervision of these engineers. An extension of this principle throughout the banking world would undoubtedly stimulate the movement toward the best possible management in industry.

It is not the intention to suggest here that every bank or banker should retain engineers to supervise the management of businesses to which they loan money. This would be impracticable, even were it possible. What is intended is the suggestion that the banker should insist that the management statement of the business should at least be on a par with the financial statement, before he will make the loan. One difficulty in this connection is that we at present have no method of appraising the value of management. However, a start has been made, and a research is under way to determine how to measure management. Prof. J. E. Roe during management week last year read a paper* that outlines the path that must be followed. He shows that the activities of the major elements of management, such as purchasing, storekeeping, effectiveness of production, utilization of equipment, quality of goods produced, labor turnover, etc., may be evaluated and compared with similar elements in the same or different industries. While the formulas are not presented as the final solution of the problem, nevertheless they are a start in the right direction. The completion of this research will probably put a useful tool in the hands of the banker for appraising the risk in industries which he is called on to finance.

Another phase of the financial end of good management is that it will increase the supply of investment capital. Good management insures high productivity with low overhead charges. The high productivity means a more rapid turnover of capital, with a consequent reduction in the amount of money required to finance a given volume of business. With the rapid turnover, an industry will be able to depend more on itself and less on the banks for financing, with the result that there will be more capital available for extending existing enterprises, or starting new ones. We are undertaking many movements for the conservation of our resources. Our supply of investment capital is one of our greatest resources. Why waste it by inefficient management?

Public's Right to Low Prices and High Wages

The statement has been proved too many times to require demonstration here, that in the best managed enterprises the wages can be higher than in poorly managed ones. High wages are of no benefit if they are coupled with high prices. But with good management costs can be kept low and prices the public has to pay need be no higher than they were with low wages and high costs. These facts form a powerful argument for the right of the public to insist on the best management in its industries. With high wages and low prices, the margin which the public has to spend above the bare cost of existence is increased, and this margin can be put into better homes, increased comforts and a higher standard of living.

**Mechanical Engineering*, November, 1923.

The foregoing statements bring us back to a consideration of the labor factor. All the demands of labor are based on the desire for a higher standard of living, whether expressed as a desire for greater leisure, more pleasure and comforts, good homes, better education for its children, etc. So long as labor is convinced that industry can stand the burden of increased wages, whether this burden be passed on to the public or taken out of the profits, just so long will labor demand and obtain what it regards as its share. But also labor is no fool. It never presses its demands to the point where it puts the industry out of business and itself out of a job. When it is convinced that it has obtained all that is possible short of that point, then it rests content.

Sound management enables labor to receive all that it demands, and yet leaves a working margin of profit which permits the enterprise to remain in business. We then have the combination of high wages with low prices, and a contented working force. We have here advanced nothing new. The underlying principles were enunciated twenty years ago by Taylor in his paper "Shop Management." It is the faulty or incomplete application of them that permits the continuation of the cycle of higher wages, higher prices and again higher wages.

The cost of labor troubles runs into countless millions each year. No matter what settlement is finally found, nobody profits thereby. The lost wages of labor are seldom made up, and the lost profits of the business are gone forever. The public pays the bill. Every labor difficulty is finally settled around a conference table. Why should not this final conference take place before, instead of after, both sides have rolled up enormous losses for themselves and the public?

It is more than probable that every labor difficulty can be traced back to some defect in management. We do not mean that there necessarily is conscious or wilful mismanagement, but there is a probability that one or more of the fundamental principles of sound management has been unconsciously violated. Where every fundamental principle has been consistently carried out, there is no handle upon which labor can or will desire to lay hold to enforce unreasonable demands. Surely, then, the public is entitled to insist that some means be found to enforce good management in industry, that this continual menace to prosperity may be ended.

A STEEL PLANT FOR BORNEO

Large Deposits of Iron Ore Similar to Those of Mayari—150,000 Tons of Steel a Year

BY NEIL VAN AKEN

THAT the Dutch East Indies are rich in iron ore has been known for decades, but the extent of the deposits was not definitely established until the Government of the islands a few years ago published its report of the investigations conducted on the islands of Celebes and Borneo.

The Larona field of central Celebes was presumed for a long time to be the only one which offered the possibilities of immediate and profitable exploitation. The absence of suitable coal was a drawback, but electric reduction was considered feasible in view of cheap water power. The Larona field has been estimated to contain several hundred million tons of iron ore, of which 15,000,000 tons of lump ore is directly available. Underneath the lump ore huge masses of soft iron clay are found, containing approximately 25 per cent of hygroscopic water. This material is similar to the ore mined by the Bethlehem Steel Co. at Mayari, Cuba. The average composition of these ores, dried at 100 deg. Celsius, is as follows:

	Per Cent		Per Cent
Iron	50.55	Magnesia	0.41
Manganese	1.19	Chromic oxide	2.03
Nickel	0.38	Water	14.41
Silica	0.60	Phosphorus	0.039
Alumina	8.05		

The favorable results of the investigations of the Celebes fields stimulated the Government of the Dutch East Indies to continue its work in other islands where iron ore was known to exist. Preliminary investigations had shown that on both sides of Strait Laut, near southeastern Borneo, considerable quantities of iron ore were available. These deposits offered advantages over those of central Celebes in the matter of access and transportation, located as they were close to tide water. The Borneo investigations conducted in 1918-19 proved so favorable that the idea of exploiting the Larona field of Celebes was side-tracked.

The Borneo iron ore differs but little in quality from that of central Celebes. The quantity available is not as great, although more than 100,000,000 tons has been staked out, of which about 20,000,000 tons consists of lump ore right on the surface. In the immediate vicinity of the deposits, opposite the Poeloe Laoet coast of southeastern Borneo have been found immense beds of coal which are said to be easily convertible into blast furnace coke. These eliminate the necessity of electrometallurgical reduction. Another advantage of Borneo over Celebes is that the Borneo iron ore deposits can be reached from deep water by rail over a distance not exceeding 10 miles. with an easy grade, while those of Celebes are located about 1000 ft. above sea level and a distance by river of 30 miles; by rail with a grade of 25 per cent, a distance of 19 miles.

Borneo Iron & Steel Works Co. Formed.

All mineral deposits of the Dutch East Indies belong to the Government, whose policy consists, as shown in the operating of the tin mines of Banka and Billiton and in the Djambi oil fields, in partial or total exploitation of mineral resources by the Government itself. This policy led the Government to participate in the formation of the newly established Borneo Iron & Steel Works Co., recently granted a charter by the Peoples Council of the islands.

The company is capitalized at 70,000,000 guilders, of which the Dutch East Indian Government receives shares for a value of 20,000,000 guilders as payment for the concession to work the iron and coal deposits, to construct blast furnaces and railroads on Government property, etc. The company undertakes to produce a minimum of 150,000 tons of steel annually, of which the Government will need 50,000 tons a year and of which another 40,000 tons will be consumed by private enterprises of the islands. The remainder will be exported to Far Eastern markets, especially Australia, and if possible to British India and Japan. The majority of the shareholders in the new company are Dutch, with a considerable participation by British and American investors.

For steam boiler capacity to be added at Homestead, Pa., by the Carnegie Steel Co., three 834-hp. Stirling boilers will be installed, to be fired with Pittsburgh district coal of about 13,000 B.t.u. calorific value to be put into boilers in multiple retort Westinghouse underfeed stokers of the dump grate and extension agitating grate type. The stoker line shaft will be driven from a 5 x 5-in. Engberg steam engine operating at 500 r.p.m. and taking 150 lb. steam at 170 deg. super-heat. Diamond chain drives are to be used for transmitting power from the engines to the shafting. The stokers include an automatic secondary ram stoke adjusting mechanism.

1923 CONSTRUCTION RECORD

Dodge Review of Building Activity for December and the Year 1923

Last year broke all previous construction records, according to F. W. Dodge Corporation. Total contracts awarded during the year in the 36 Eastern States and the District of Columbia (including about seven-eighths of the total construction of the country) amounted to $3,990,483,000. This indicates more than $4,500,000,000 worth of construction in the entire country.

In 27 of these states the increase over 1922, which was itself a record-breaking year, was nearly 5 per cent. After an unusually heavy spring season, there was a slight reaction through the summer months, followed by an unusual increase in the late fall. December, 1923, showed an increase of 25 per cent over the previous December.

The increase was largely in residential and industrial buildings. Residential construction increased 18 per cent over 1922, which was rather surprising in view of the higher cost levels last year, and industrial construction increased 16 per cent. Construction of public works and utilities remained about stationary; business buildings declined 9 per cent, and all other classes combined decreased 15 per cent from 1922.

Indication of Unsatisfied Demand

Contemplated new work reported during the year 1923 in the 36 states amounted to $7,421,940,000, which is 86 per cent in excess of the toal of contracts awarded (or work actually started). The normal excess is about 50 per cent. This may be taken as an indication of a demand that has not been fully satisfied. However, the excess of contemplated work reported has been abnormally large every year since the war, and is not sufficient to indicate an increased volume of construction in 1924.

Building costs are now at a level nearly 30 per cent above the prices of general commodities; labor and materials are generally scarce. It seems unlikely that 1924 can better the 1923 record, or even equal it. A total construction program of $4,000,000,000 in the entire country seems a reasonable estimate to make at the present time. A moderate decline from the 1923 construction volume, about 10 per cent, ought to have a wholesome influence on building conditions.

Records for Various Districts

Contracts awarded during December in New York State and Northern New Jersey amounted to $111,070,000, an unusually large amount for the last month of the year. The decrease from November was 11 per cent. The year's total for the district is $1,068,935,000. Residential buildings accounted for 60 per cent. Other important items were: 13 per cent for business buildings, 8 per cent for educational buildings, 8 per cent for industrial plants and 6 per cent for public works and utilities.

December building contracts in New England amounted to $26,617,000, an increase of 8 per cent over November. Total construction started during the entire year 1923 amounted to $332,857,000. Last year's total included: 47 per cent for residential buildings, 17 per cent for business buildings, 11 per cent for public works and utilities, 9 per cent for industrial plants, and 8 per cent for educational buildings.

December building contracts in the Middle Atlantic States (Eastern Pennsylvania, Southern New Jersey, Maryland, Delaware, District of Columbia and Virginia) amounted to $24,521,000, an increase of 3 per cent over the preceding month. Total construction started in this district during 1923 amounted to $374,182,000. Last year's total included: 47 per cent for residential buildings, 15 per cent for business buildings, 13 per cent for public works and utilities, 12 per cent for industrial plants, and 6 per cent for educational buildings.

December contracts in Western Pennsylvania, West Virginia, Ohio and Kentucky amounted to $36,158,000. This was a decrease of 12 per cent from November. Total construction started in this district during the entire year 1923 amounted to $593,995,000. Last year's record included: 34 per cent for residential buildings, 29 per cent for public works and utilities, 14 per cent for industrial plants, 10 per cent for business buildings, and 8 per cent for educational buildings.

Contracts awarded in December in the southeastern states (the Carolinas, Georgia, Florida, Tennessee, Alabama, Mississippi, Arkansas and Louisiana) amounted to $31,832,000, an increase of 8 per cent over November. The year's total of construction started in this district was $486,757,000, which included the following important items: 31 per cent for residential buildings, 20 per cent for public works and utilities, 15 per cent for industrial plants, 14 per cent for business buildings, and 10 per cent for educational buildings.

December building contracts in the Central West (Illinois, Indiana, Iowa, Wisconsin, Southern Michigan, Missouri, Kansas, Nebraska and Oklahoma) amounted to $60,869,000. The drop from November was 9 per cent. The year's total for these states was $1,006,422,000. The 1923 record included: 37 per cent for residential buildings, 21 per cent for public works and utilities, 13 per cent for industrial buildings, 13 per cent for business buildings, and 8 per cent for educational buildings.

December building contracts in Minnesota, the Dakotas and Northern Michigan amounted to $8,680,000, an increase of 7 per cent over the previous month. The 1923 construction total for these states was $127,336,000, the record figure for the district. Last year's record total included: 33 per cent for residential buildings, 23 per cent for public works and utilities, 12 per cent for industrial buildings, 11 per cent for business buildings, and 11 per cent for educational buildings.

Large Increase in the Output of Copper in 1923

The smelter production of copper in 1923, according to the Department of the Interior, as determined by the Geological Survey from reports of the smelters showing the actual production for 11 months and the estimated production in December, was about 1,477,000,000 lb., compared with 950,000,000 lb. in 1922, an increase of slightly over 55 per cent. The smelter production of copper for December, as estimated by the producing companies, was 132,000,000 lb., or at the rate of about 1,584,000,000 lb. a year.

The production of new refined copper from domestic sources, determined similarly, was about 1,435,000,000 lb., compared with 905,000,000 lb. in 1922. In 1923 the production of new refined copper from domestic and foreign sources plus the imports of refined copper amounted to about 2,118,000,000 lb., compared with 1,359,000,000 lb. in 1922. In addition to the output of new refined copper about 130,000,000 lb. of secondary copper was produced at the refineries, compared with 146,000,000 lb. in 1922, so that the total output of refined copper was about 2,248,000,000 lb. in 1923 and 1,505,000,000 lb. in 1922.

The imports of copper in unmanufactured form during the first 11 months of 1923, according to the Bureau of Foreign and Domestic Commerce, amounted to 623,519,135 lb., compared with 541,013,220 lb. during the entire year 1922 and 350,472,611 lb. in 1921. The exports for the first 11 months of 1923 amounted to 739,049,275 lb., compared with 743,039,888 lb. during the entire year 1922. The figures showing the imports and exports in December will be available about Jan. 20, 1924.

The stocks of refined copper in the hands of domestic refineries on Dec. 31, 1923, as estimated by the refining companies, were about 256,000,000 lb., compared with 216,000,000 lb. on Dec. 31, 1922. The stocks of blister copper and material in process of refining, in the hands of the smelters, in transit to refineries, and at refineries on Dec. 31, 1923, were estimated by smelting and refining companies at about 490,000,000 lb., compared with 361,000,000 lb. on Dec. 31, 1922.

The quantity of primary refined copper withdrawn on domestic account during the year was about 1,305,000,000 lb., compared with 897,000,000 lb. in 1922.

BRITISH FOREIGN TRADE

November Exports Second Largest for 1923—Imports Still Comparatively Light

Exports of iron and steel from Great Britain last November were 403,261 gross tons and were second only to the 435,630 tons sent out in May. They were only 1786 tons in excess of the October exports. November imports were 117,628 tons or close to the October figures which were one of the smallest for the year. These data include scrap iron and steel. Comparative data for both exports and imports are as follows:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
Aver. per month, first quarter, 1923...	358,208	128,032
Aver. per month, second quarter, 1923..	402,471	126,042
July, 1923	314,522	128,486
August, 1923	330,431	121,906
September, 1923	344,358	127,893
Aver. per month, third quarter, 1923...	329,770	126,095
October, 1923	401,475	117,372
November, 1923	403,261	117,628
Average per month, 1922	295,980	82,215
Average per month, 1921	144,885	152,734
Average per month, 1920	274,881	128,685
Average per month, 1919	188,519	50,801
Average per month, 1913	420,757	195,264

More detailed data of the exports are as follows:

Principal British Exports, Gross Tons per Month

	1913	1922	November 1922	November 1923
Pig iron } Ferroalloys }	93,700	66,159	103,717 / 13,991	47,437 / 10,361
Steel rails	42,200	21,300	21,779	27,486
Steel plates	11,200	6,700	11,433	21,873
Galvanized sheets	63,500	43,600	40,204	61,742
Steel bars, rods, etc...	20,900	19,100	27,826	33,596
Tin plates	41,200	37,400	37,307	55,552
Black plates and sheets	11,700	18,700	23,104	37,497

Exports of scrap iron and steel in November were 8370 tons, or 10,130 tons per month for the first 11 months of this year, as compared with 12,880 tons per month in 1922. In 1913 there were 9600 tons per month.

Data as to importations of importance are as follows in tons per month:

	1913	1922	Jan-Nov., 1923
Iron ore	620,000	289,400	490,188
Manganese ore	50,100	28,109	44,130
Pig iron and ferroalloys	18,000	12,800	8,476

Plans of the Dominion Alloy Steel Corporation of Toronto

TORONTO, ONT., Jan. 14.—The Dominion Alloy Steel Corporation, 410 Royal Bank Building, Toronto, Ont., has been recently incorporated with a capital stock of $15,000,000, divided into $7,500,000 of 8 per cent cumulative convertible preferred stock and $7,500,000 of common. The company's securities were approved by the Michigan Securities Commission. While plans have been completed for an extensive layout and much larger production in the future, the plant will be constructed in units, the first to have a capacity of from 40,000 to 50,000 tons of alloy and other fine steel per annum. It will consist of open-hearth and electric furnaces for the production of bars and shapes. The preliminary plans and early stages of construction will be in charge of R. D. Nye, who was associated with the construction of the Central Steel Co.'s plant at Massillon and was formerly chief engineer with the United Alloy Steel Corporation, Canton, Ohio.

The Dominion Alloy Steel Corporation has acquired a site of 250 acres on the St. Clair River, immediately adjoining the plant of the Imperial Oil Co., just south of the city of Sarnia, Ont. The property was selected as a location providing ideal facilities for the economical assembly of raw material. The company will use electric power which is available from the Ontario Hydro Electric Power Commission. It proposes to start building operations next March.

As Canada stands second nation in the manufacture and usage of automobiles, first in the exportation of automobiles, and has upward of $600,000,000 invested in the automotive industry, it is believed that the Dominion Alloy Steel Corporation is assured an active demand for its products.

British Pig Iron and Steel in December and for 1923

LONDON, ENGLAND, Jan. 14 (*By Cable*).—December pig iron production was 626,900 gross tons, comparing with 597,600 tons in November and with 714,200 tons in May, the year's highest. The output of steel ingots and castings in December was 653,300 tons, or less than the November production of 749,500 tons.

Comparative production figures for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month	855,000	639,000
1920, per month	669,500	755,600
1921, per month	217,600	302,100
1922, per month	408,300	486,000
January, 1923	567,900	634,300
February	543,400	707,100
March	633,600	802,500
April	652,200	749,400
May	714,200	821,000
June	692,900	767,700
July	655,100	639,500
August	599,800	567,500
September	558,600	695,100
October	592,600	702,200
November	597,600	749,500
December	626,900	653,300
1923, per month	619,800	705,500

The year's total for pig iron from the above data was 7,437,900 tons, and for steel ingots and castings 8,465,500 tons. These totals are close to the 1920 records. The steel, however, exceeds the 1913 output.

President Coolidge Declines to Direct Tariff Commission Controversy

WASHINGTON, Jan. 15.—President Coolidge has declined to act as arbiter to settle a difference of opinion within the Tariff Commission relating to the propriety of members of the commission participating in a case which involves any industry in which the members are interested, either directly or indirectly. Members of the commission called upon the President on Thursday of last week when this question was brought before him in the course of a prolonged conference, and it was stated later that the President concluded the meeting by telling members of the commission that no legal aspects being involved, he considered that the question was one for the commission to settle itself. The resolution which would bar participation in hearings by members of the commission who may have any financial interest in the subject under inquiry, is reported to have been defeated by a three to three vote.

Portland Cement Makes Remarkable Record

Figures of the United States Geological Survey show that the production of Portland cement in 1923 aggregated 137,377,000 bbl., compared with the previous maximum of 114,790,000 bbl. in 1922 and with 100,023,245 bbl. in 1920.

Attention is directed by the Cement Information Service, New York, to the fact that, in spite of the huge demand which was met by this unprecedented production, the prices were kept relatively low. Using the 1921 average price as a base, the curve of cement prices has been below that base throughout both 1922 and 1923. This is compared with the wholesale prices of all building materials, again using 1921 as a base. In this case the curve passed above the base in May, 1922, and has remained considerably above it throughout all the subsequent period. In both cases the figures were gathered by the United States Bureau of Labor Statistics. As of November, the cement price was 5 per cent below the 1921 average, while the price of all building materials was 9 per cent above that average.

Plans of New Companies

Ernest V. Beck, formerly manager of the Central Electric Supply Co., Denver, and James W. Ryall, formerly manager of the electrical department of the Mine & Smelter Supply Co., that city, announce their association as the B. & R. Electrical Supply Co., 1414 Glenarm Place, Denver. The company has been organized with $50,000 capital stock, and will conduct an electrical wholesale supply house.

The Carana Mfg. Co., 224 Locust Avenue, Amsterdam, N. Y., has been organized to manufacture a preservative for brake lining. H. Hanna is one of the principals.

The Colonial Tool & Forge Co., Elkton, Md., has been organized to manufacture screw drivers, cold chisels and wrecking bars. The company has leased a plant with 12,000 sq. ft. of manufacturing space at Elkton and also has a plant at Columbiana, Ohio, which was established in 1905 and has been operating since. L. V. Blue is president; M. L. Dennis, vice-president, and Gilman Spencer, secretary-treasurer, 2125 Cypress Street, Philadelphia.

The Tri-State Sentinel Refrigeration Co., 356 East Eleventh Street, Erie, Pa., has been organized to act as distributor for the Sentinel automatic refrigerating machines made by the James W. Smith Co., Indianapolis, which will move to Erie, within the next 30 days. The new company purchases complete machines from the Smith Company, but materials, such as coils, valves, and ammonia fittings, are purchased in the open market. H. A. Schlaulecker is president and treasurer.

T. P. Carlson, Inc., Lincoln, N. J., has been organized to manufacture plate and sheet metal work, specializing in electrically welded tanks, both for storage and pressure. A plant has been leased and will be equipped with welding sets, air compressor bending rolls, shears, punch presses, cranes and drill presses. T. P. Carlson is president.

S. W. Farber, Inc., 141 South Fifth Street, Brooklyn, has been incorporated with $400,000 capital stock to manufacture brass goods, household utensils and general hardware products, having taken over a business conducted by Mr. Farber for several years. Operations will be continued along the same lines. S. W. & E. W. Farber are the principals.

The Superior Wire Cloth Co., York, Pa., organized a few months ago, has started operations in the factory at Turnpike, near New Freedom. Several looms were put into operation, of which there is a total of 56.

The Automobile Interlock Co., 31 Clinton Street, Newark, N. J., has been incorporated with capital stock of $125,000 to manufacture a mechanical device for preventing automobile thefts. Harry Griffinger heads the company.

The Induction Radio Corporation, 103 Broadway, Brooklyn, has been incorporated as a subsidiary of the Igo Amalgamated Industries, which controls six companies. The new unit will install equipment and prepare for manufacturing radio equipment and parts at an early date. Mr. Goldberg heads the company.

B. S. Ellis & Co., Inc., 15 William Street, New York, incorporated with capital stock of $100,000 to manufacture rubber products, will confine present activities to jobbing in crude rubber. Mr. Ellis heads the company.

The Cecil Mfg. Co., Inc., New York, organized with $150,000, will manufacture metals and silverware products. It has plant and equipment, and is now in production. The incorporators are M. L. William, and Leopold Cecil, 530 West 113th Street.

The Nestler Rubber Fusing Co., New York, has been incorporated with capital stock of $50,000 to manufacture rubber fuses and kindred specialties. Molds and castings are being made by a concern in New York. J. C. Kimball and E. Nestler are the incorporators. Address care of J. Blumenthal, 1675 Broadway.

Westburr, Inc., 25 West Forty-third Street, New York, has been incorporated with $100,000 capital stock and 5000 shares no par value stock under Delaware laws to manufacture a portable, self-contained radio outfit. The company has a plant in operation at 250 West Fifty-fourth Street. C. Burr heads the company.

The Phoenix Welding Co., 389 Montgomery Street, Jersey City, N. J., has been organized to do acetylene and electric welding on commercial and boiler work. A shop has been purchased and equipment installed. The company is in the market from time to time for welding wire, etc. H. A. Huff heads the company.

The Day Oil Burner Co., 4300 Dupont Avenue, South, Minneapolis, Minn., has been organized with capital stock of $100,000 to manufacture oil burners for cook stoves and ranges. Plant has been leased but the company does not know as yet what equipment will be needed. William F. Yers is president; Mark Clarity, vice-president, and Arthur McConville, secretary-treasurer.

The General Parts Corporation, Flint, Mich., has been organized with capital stock of $250,000 for the purpose of buying automobile services. No manufacturing will be done. L. H. Bridgeman is president; Frank Lay, vice-president, and D. E. Winslow, secretary-treasurer.

The La Fay Thermos Heating Co., 97 Warren Avenue, West, Detroit, has been organized with capital stock of $50,000 to install thermos jackets around cast-iron boilers, for the purpose of conserving fuel. Materials used are pressed sheet asbestos, stove bolts and washers, angle iron and cement. T. P. Stephens is secretary-treasurer.

The North Texas Tool & Supply Co., 408 Ohio Avenue, Wichita Falls, Tex., has been organized to distribute oil well supplies to users of oil field equipment. Some machinery will be installed about the middle of the year. J. B. Warren is one of the principals.

The Schara Mfg. Corporation, 710 Wyandotte Street, Kansas City, Mo., has been working on new designs of padlocks, which it purposes to manufacture. It has not been decided whether the company will operate a plant or let the work to contract. Moe Hopper, treasurer, would like to hear from manufacturers of die castings and concerns doing stamp work.

The Nokol Sales & Service Co., 414 East Main Street, Richmond, Va., recently organized, will act as distributor of automatic oil heating equipment, representing the Nokol Co. of Chicago. H. B. Johnson heads the company.

Joseph Teipel, W. F. Exner and F. G. Langbein, formerly associated with the Mancha Storage Battery Locomotive Co., as assistant general manager, secretary and purchasing agent, respectively, have withdrawn from the company and organized the St. Louis Steel Casting Co., whose temporary address is 3432 Potomac Street, St. Louis. A new plant is under construction at 100 Malt Street, where offices will be opened about Feb. 1. Under present plans the company will be in full production not later than March 15. Mr. Teipel is president, Mr. Exner, secretary, and Mr. Langbein, treasurer.

The Auto Loading Device Mfg. Co., 408 Garfield Building, Detroit, has been organized to manufacture automobile loading apparatus and has made complete arrangements for manufacturing. G. C. Fedderman is president and F. B. Duane, secretary-treasurer.

The Fabric Body Corporation, 5940 Cass Avenue, Detroit, has been incorporated with capital stock of $200,000 to manufacture automobile bodies of special design. Work will be done by contract. Kenneth L. Childs, formerly research and development engineer of the Standard Textile Products Co., New York, is president; J. H. Main, director of purchases for the General Motors Corporation, vice-president and treasurer, and W. W. Gedge, for the past 10 years experimental engineer with the Stearns & Foster Co., Detroit, is secretary.

The Lincoln Road Machine Co., 1420 City National Bank Building, Omaha, Neb., has been organized with $300,000 capital stock under Delaware laws, to manufacture road graders and maintainers. Castings will be manufactured by contract. Plant has been leased at Council Bluffs, Iowa, and complete shop equipment installed. O. B. Walters is president; R. E. Miller, vice-president, and E. R. Burke, secretary.

The Batavia Clamp Co., Batavia, N. Y., has been incorporated with 3000 shares of no par value stock to manufacture Colt electric clamps, which have been made there for many years. It has complete plant for production. Charles W. Gardner is president and treasurer.

Jenkins Brothers, Bridgeport, Conn., makers of valves, have begun production in their new five-story plant, which contains approximately 150,000 sq. ft. of manufacturing space. C. V. Barrington is general manager.

R. H. Fitzsimmons and W. R. Cole, formerly associated with the Russell Machine Co., Pittsburgh, announce the formation of a business under the name Fitzsimmons-Cole Machinery Co., to deal in new and used machinery, with offices at Twenty-eighth Street and Allegheny Valley Railroad, Pittsburgh.

The Rubwood Wheel Corporation, Monson, Mass., which recently was organized, has received its first big order, one for 14,000 automobile wheels. The plant was completed a short time ago and is now working on the order.

The United Electric Co., 68 Cortlandt Street, New York, has been incorporated with capital stock of $40,000 to manufacture radio machinery and parts, but plans for the present to act as distributor of General Electric and Westinghouse motors, also general electrical equipment. Earl Victorson is president.

The Compress Fuel Co. will soon be organized at Savannah, Ga., to manufacture fuel briquettes. Plans provide for the construction of a fuel briquette plant in Savannah, which is to cost approximately $1,000,000, with machinery. It is understood that a powerhouse also will be built. James Imbrie, head of Imbrie & Co., Ltd., 61 Broadway, New York, who is connected with several other projects in Savannah, is interested in the new company.

The Portable Pump Corporation, 15 Whitehall Street, New York, has been incorporated with $250,000 capital stock, to manufacture pumping machinery and parts, having secured manufacturing rights for a pump of European make and origin. Plans are being made with local concerns to manufacture castings and other parts. The company will establish an assembling plant in the vicinity of New York, but the location is not yet decided. Carl M. M. Armfelt, president of the company, states that production will be about 1000 pumps per month. Complete output will be turned over to the Henry Card Co., Knickerbocker Building, New York, which will be sole distributer.

The Egbert Concrete Products, Inc., East Forty-first Street, Brooklyn, has been incorporated with capital stock of $100,000 to manufacture concrete blocks, bricks, etc. It has taken over the business and properties of the G. W. Egbert Co. and will continue the business. W. B. Cruickshank, G. W. Egbert and G. W. Egbert, Jr., are incorporators.

New Trade Publications

Compressed Gases.—International Oxygen Co., Newark, N. J. Leather covered notebook 2½ x 3½ in. containing data intended to provide users of compressed gases the answers to questions arising in daily practice. The data is given in 19 pages. The memo pages number 43.

Pneumatic Die Cushions.—Marquette Tool & Mfg. Co., Chicago. Catalog No. 3, 159 pages, 6 x 9 in. Describes a large variety of die cushions for power presses. The purpose of the cushions is to provide even pressure for the entire stroke when metal drawing is done in single-acting punch presses, to provide a means for overcoming unevenness in gage on toggle presses, to make toggle presses triple acting, to make two operations in one stroke of the press and to hold bottoms of channels and brake drums flat. Illustrations are numerous and include half tones showing the cushions on various types of presses. Line drawings show the component elements of the cushions and also the proper method of installing. Pneumatic toggle links and automatic pressure controls are also described and illustrated. The arrangement of the material, together with the wealth of illustration, should make the catalog of unusual value to prospective users of the equipment.

Drills, Reamers and Other Tools.—Cleveland Twist Drill Co., Cleveland. Catalog Forty, size 5¼ x 7½ in., 226 pages. Sizes and list prices are given on a variety of carbon and high-speed drills, including those manufactured by the Cle-Forge, process, which are featured as combining the advantages of both forged and milled drills. The company's Mezzo drills of a new tool steel are also shown. In reamers, the Quick-Set adjustable is featured, also the Peerless high-speed reamers and Paradox adjustable reamers which have case hardened machinery steel bodies with inserted tool or high-speed steel blades. A variety of sockets, tools for turret lathes, counterbores, end mills and other material is shown. A section is devoted to useful information and another to a telegraph and cable code. The catalog has a classified and a thumb index.

Mechanical Tools, Rules and Measuring Tapes.—Lufkin Rule Co., Saginaw, Mich. Catalog No. 11. Describes and illustrates a wide variety of steel and woven measuring tapes. Micrometers, combination squares, bevel protractors and combination sets, spring calipers and dividers, thickness and depth gages are among the small tools. An extensive line of steel and boxwood rules is shown. List prices are given.

Calendar.—Winchester Repeating Arms Co., New Haven. Size 14 x 28 in. Art poster top in colors; calendar 6 x 13 in., white on black.

Capstan Car Puller.—Silent Hoist Co., 302 McDougal Street, Brooklyn, N. Y. Bulletin describing electric car puller consisting of a vertical capstan winch and driven by electric motor, both units being mounted on a common base. The space required is 22 x 44 in., and draw bar pull is 5000 lb. at 25 ft. per min.

Cranes and Hoists.—Herbert Morris, Inc., Buffalo. Book 5060, with title of "Thrift In Lifting." Describes and illustrates standard cranes. Line sketches and dimensions are given and illustrations include actual installations. Single and double beam, underhung, and jib cranes and several other items including runways, trolleys, chain blocks, monorail tracks and slings of various types are shown.

Welding Instruction.—Welding Engineer, 608 South Dearborn Street, Shicago. Pamphlet of 14 pages, giving lessons, exercises and examinations in oxy-acetylene and electric arc welding. Temperature color and oxyacetylene flame adjustment charts are included.

Air Heater.—Combustion Engineering Corporation, Broad Street, New York. Four-page folder dealing with a heater of the plate type, the plate elements forming a series of parallel passages through which air and the hot gases pass alternately. These alternate parallel streams flow in opposite directions, resulting in maintaining a practically constant temperature difference between the gas on one side of any given plate and the air on the other side. This heater is designed for use in boiler plants and particularly for heating air for combustion purposes.

Direct Acting Magna Pumps.—Guild & Garrison, 463 Kent Avenue, Brooklyn, N. Y. Four-page folder devoted to pumps ranging in size from 8 x 5 x 10 in. to 26 x 17 x 24 in., and having capacities ranging from 15 to 283 gal. per min. The pump is designed especially for thick semi-fluids and heavy liquids, being particularly adaptable to sugar house work.

Transmission Equipment.—Colonial Supply Co., Pittsburgh. Booklet of 24 pages under the title of "The Kites Tail," so named because as the tail stabilizes the kite, so, it is said, does the equipment described stabilize operating costs. The tail of the figurative kite is made up of several strands, and under each strand a separate line of equipment is shown. These include Skayef self-alining ball-bearing hangers and pillow blocks, loose pulleys, and friction clutch pulleys, steel split pulleys, Alexander leather belting and other equipment.

Bronching and Assembling Press.—Oilgear Co., Milwaukee. Bulletin No. 30 describes new line of self-contained presses in 15, 25 and 50 ton capacities.

Grinding Machines.—Hill-Curtis Co., Kalamazoo, Mich. Group of one page bulletins, describing ball bearing bench and floor grinders, 18-in. wet tool grinder, the No. 1¼-T grinding and polishing unit, and other equipment.

Air Compressors.—Curtis Pneumatic Machy. Co., St. Louis. Catalog C-24-A, 24 pages, describes single and two stage, portable and stationary machines for garage and similar use. In addition to features of design and specifications covering the various types and sizes, information is given as to the proper equipment for given service. Automatic starting and stopping devices, air stands, tanks and fittings are also shown.

Gears.—Grant Gear Works, Boston. Catalog of 96 pages. Includes sizes and prices of wide line of gears of brass, iron, rawhide, fibre and steel kept in stock or cut to order. Worm gear reduction units, and sprockets and chains are also shown. Several pages are devoted to useful information including the drawing of the standard involute tooth and spur and bevel gears.

Heat Treated Gearing.—R. D. Nuttall Co., Pittsburgh. Bulletin 25, 24 pages. Heat treatment of carbon steel gears, especially those subjected to heavy duty and shock is discussed and the advantage of the company's B P process briefly outlined. Under the "Economics of Gearing," tables showing the saving in gear maintenance cost per 1000 car-miles are given. Several paragraphs describe how steel responds to heat, and water, oil, and the B P quench are described, photomicrographs of steel after each quench being shown. The physical properties of N P gearing, and stresses on gear teeth are discussed. A section is devoted to the mounting of electric railway motor pinions.

Twist Drills and Reamers.—Whitman & Barnes Mfg. Co., Akron, Ohio. Folder. January stock list of carbon and high-speed steel tools, with list of distributors. A calendar for three months, and a market letter are features.

Transmission Chains and Sprockets.—Diamond Chain & Mfg. Co., Indianapolis. Catalog B., third edition, 32 pages. Describes company's chains, the illustrations being full size. Names of chain parts, care of chains and sprockets, and tables giving chain specifications and sprocket diameters are included.

Grinding Machines.—Hisey-Wolf Machine Co., Cin-

cinnati. Bulletin No. 1305. Describes features of ball bearing machines of bench and floor types in six sizes, from ½ to 10 hp. capacity.

Oxygen and Acetylene Cylinders.—Air Reduction Sales Co., New York. Pamphlet of 10 pages describing care of cylinders.

Wires For Measuring Screw Threads.—Van Keuren Co., Watertown, Boston. Pamphlet devoted to the three-wire measurement of National or U. S. Std. screw threads. The best size measuring wires for standard pitch threads from 4 to 80 per in. and a formula for obtaining pitch diameter of threads by three wire method are included. Suggestions relating to the use of wires with light waves and with mechanical measuring devices are given.

Welding Machines.—Wilson Welder & Metals Co., Inc., New York. Catalog describing and illustrating welding machines and Color Tipt welding metals. The illustrations include views of large electric welding repair jobs and steel tank work.

Transmission Equipment.—Winfield H. Smith, Buffalo. Catalog No. 21 devoted to light power transmission equipment, including worm gear reduction units up to 3 hp. Small hangers, pillow blocks and pulleys for experimental laboratories are also shown.

Rotary Shears.—Quickworth Co., St. Marys, Ohio. Catalog No. 60, 35 pages. Describes features of the company's rotary shear, designed to cut all gages of metal from the lightest up to and including 1 in. thick. The machines, available in seven sizes are adaptable to all classes of straight, circular, and irregular cutting, including the cutting of openings in sheets without cutting in from the side. Specifications are given, and testimonial letters and a list of users are included.

Copper Products For Electric Railways.—Anaconda Copper Mining Co., New York. Publication C 1, 31 pages. Trolley wire, lead sheathed power cable, power transmission wire, bus bars, commutator copper and other products are described.

Brass Water Pipe.—American Brass Co., Waterbury, Conn. Second edition of publication B1, 31 pages 8 x 11 in. giving data on brass pipe for water service. Characteristics of lead, iron and brass pipe are discussed and comparative cost of brass pipe and iron pipe are shown. Typical installations of brass pipe are illustrated, and pages are devoted to the working of brass pipe.

Condenser Tubes.—American Brass Co., Waterbury, Conn. Publication B2, 8 pages. Discusses the composition of tubes and quality of raw material used, the physical quality or soundness of the alloy, and the strength and stiffness of the tubes. Specifications for Admiralty or "70 & 30" condenser tubes are given.

Welding and Cutting Apparatus.—Alexander Milburn Co., Baltimore. Booklet describing generators, compressing plants, welding torches, regulators, gages and other equipment.

Carbide Lights.—Alexander Milburn Co., Baltimore. Booklet. Lights up to 16,000 candlepower for railroad, construction and mine work, for dredging and wrecking work are described and illustrated. Headlights and miners lamps are also shown.

Tumbling Mills.—W. W. Sly Mfg. Co., Cleveland. Catalog S-99, 32 pages, profusely illustrated. A valuable treatise on the cleaning of castings by the tumbling method. Illustrations and descriptions of dust arresters of various types are also given and similar data regarding Sly cinder mills for reclaiming metal and coke from foundry refuse.

Automatic Machinery.—Baird Machine Co., Bridgeport, Conn. Bulletin giving illustrations and data on automatic wire-forming machine, Baird tandem machine for stamping small metal parts, Baird chucking machine and accessories and all Baird automatic machines.

Pneumatic Charging Machines.—The Whiting Corporation, Harvey, Ill. Illustrated folder descriptive of results obtained in foundries by the use of Whiting pneumatic charging machines. An instance is cited of a foundry which melts 220 tons a day in two cupolas, at a charging cost of 19c. per ton of iron melted, by using these charging machines.

Steam and Centrifugal Pumps.—The M. T. Davidson Co., 43 Keap Street, Brooklyn. Various bulletins bound together in loose-leaf form. They cover in great detail and with many illustrations the various points of interest to the buyer and user of steam and centrifugal pumps.

A ninth edition of its shape book has been issued by the Carnegie Steel Co., Pittsburgh. The book has 345 pages and contains profiles of the sections rolled on the structural, plate, bar and rail mills of the company, together with tables and other data relating to these products. As in the preceding edition, the weights of beams and channels conform to the action taken by the Association of American Steel Manufacturers, effective Sept. 1, 1920, by which fillets and roundings are included in the computation of weights. Changes have been made in the section numbers of standard beams and particularly in the section numbers of angles. A section of 87 pages is devoted to weights of flat rolled steel and other useful data.

Saws for every purpose, saw tools, machine knives and other equipment are described and illustrated in an unusually attractive catalog being distributed by E. C. Atkins & Co., Indianapolis. A large section is devoted to circular and mill saws and another to band saws. Saw swages, swage shapers, upset swages, side files, saw gummers and bench and floor grinding machines and a variety of grinding wheels are among the items in the section devoted to tools for the filing room. Machine knives for a wide variety of uses are illustrated. Among metal cutting saws are slitting, screw slotting, and circular milling saws, also Kwik-Kut metal cutting machines and the No. 3 metal band saw machine. Sections are devoted to cross cut saws and accessories, wood saws and a variety of hand saws, saw tools and specialties. The catalog is known as No. 19, and contains 263 pages, 7 x 10 in. Illustrations are large and clear, and on each item specifications, list prices, and names and prices of repair parts are given.

Industrial News Items

The Mars Hill plant of the Lafayette Motors Corporation, Indianapolis, has been sold to the International Printing Co., 230 West McCarty Street, Indianapolis, manufacturer of paper boxes and labels. The present quarters of the printing company at 230 West McCarty Street, under lease, will be abandoned and the machinery removed to the Mars Hill plant. When the removal is completed the company plans to purchase cutting machinery and other equipment, cost estimated at $50,000. The amount involved in the deal was announced as in excess of $150,000. The Twyman Mfg. Motors Co., Indianapolis, which recently placed machinery for the rebuilding of automobiles in the Lafayette plant, is removing its equipment to the north half of the plant of the Premiers Motors, Inc., at Twenty-first and Olney Streets.

The Whitney Metal Tool Co., manufacturer of ball-bearing punches and shears, Rockford, Ill., is building a 40-ft. addition to its factory, also adding another floor, which more than doubles present machine shop capacity. After the addition is completed, the company will install several new automatic machines. The capacity of the hardening department has already been doubled.

The Burdett Oxygen Co. has purchased an acre of land in the industrial section of Knoxville, Tenn. Construction of a new plant for the manufacture of oxygen will be started immediately.

The Milwaukee Corrugating Co., Milwaukee, has established a branch plant at La Crosse, Wis., having purchased three buildings formerly occupied by the Gund Brewing Co. The bottling plant will be remodeled and ready for operation about March 1. Frank Vyvyan will leave the Milwaukee plant Feb. 1 to manage the new branch. This expansion is a step in the policy of the company to insure "same day" shipments in all its territories.

The Aultman & Taylor Machinery Co., Mansfield, Ohio, has been purchased by the Advance-Rumely Co., LaPorte, Ind., manufacturer of traction engines. No disclosures relative to the financial settlement involved in the transaction were made, but it is understood that the purchase price was comparatively low. F. P. Mount, LaPorte, is president of the company.

The Dale Machinery Co., which has again engaged in the selling of metal working machinery, having recently opened an office in Chicago, has opened a New York office within the past week at 50 Church Street. J. J. Dale, who was one of the organizers of the Consolidated Machine Tool Co., is head of the Dale Machinery Co. The Ohio Machine Tool Co., Kenton, Ohio, manufacturer of shapers, recently appointed the Dale company as exclusive representative in the Chicago territory.

The Rogers-Brown Iron Co. has appointed Agnew, Batteiger & Co., Philadelphia, as exclusive sales agents for Rogers-Brown ore. J. Carson Agnew, president of the latter company, was formerly connected with the Rogers-Brown company.

Machinery Markets and News of the Works

BETTER BUYING IN WEST

More Machine-Tool Activity at Chicago and Cincinnati—East Is Fair

Railroads, Electrical Companies and Automobile Manufacturers Lead in Purchases

Most of the more important buying of machine tools, as well as prospective purchases, may be attributed to the activities of railroads, electrical companies and makers of automobiles, parts and accessories, while in a lesser degree radio parts manufacturers and brass goods shops are responsible for some business.

From Pittsburgh west to Chicago the demand for machine tools since the first of the year has shown improvement in spots. In Chicago there has been heavier buying by industrial companies. The Automatic Electric Co., Chicago, has placed substantial orders for punch presses, automatic and hand screw machines and drill presses. Purchasers of smaller lots of tools included the Standard Oil Co. of Indiana, the Creamery Package Mfg. Co., Chicago, and the Pettibone-Mulliken Co., Chicago. The Chicago Board of Education has distributed orders amounting to $15,000 for tools for a technical high school.

In the automobile field an outstanding inquiry is from the Edward G. Budd Mfg. Co., Philadelphia, maker of steel bodies. The Ford Motor Co., Detroit, has bought five or six large turret lathes. The Olds Motor Works at Lansing, Mich., has inquired for a miscellaneous list of tools. The Crosley Mfg. Co., Cincinnati, radio receiving sets, has bought a number of small machines.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, was a large buyer within the past week, and the General Electric Co. is expected to place orders this week for a large amount of equipment for its new switchboard plant in Philadelphia.

Prominent among railroad inquiries is that of the Santa Fe to be issued this week for $250,000 worth of cranes and $250,000 worth of machine tools for shops at San Bernardino, Cal.

Some machine tool builders have advanced prices, and there is talk of further advances on engine lathes following a 10 per cent rise by an Ohio company.

New York

NEW YORK, Jan. 15.

RAILROADS, electrical manufacturers and makers of automobile parts and accessories seem to offer the most promising prospects for increasing demand for machine tools this month. The General Electric Co. is buying for its new plant in Philadelphia, the Sprague Electric Works is expected to buy shortly a list of tools on which it has received quotations within the past few weeks and other companies in the electrical field, being busily engaged, are also figuring on smaller quantities of equipment. One of the largest inquiries in the East from the automobile field has been issued by the Edward G. Budd Mfg. Co., Philadelphia, maker of steel automobile bodies.

The New York Central Railroad continues to buy. One of its purchases last week was a 2500-lb. steam hammer. The Southern Railway, which recently closed for most of its list, has placed an order also for a lathe, 36 in. x 16 ft. An order has come from the Llewellyn Iron Works, Los Angeles, for two 26-in. engine lathes.

M. D. Goodman, dealer in electrical machinery, 185 Bigelow Street, Newark, N. J., is in the market for a 500 hp., 440 volt, three phase, 60 cycle, slow speed, slip ring induction motor.

The Hay Foundry & Iron Works, Newark, N. J., is in the market for an angle shear, capacity to cut 8 x 8 x 1 in angles.

The Columbia Metal Box Co., 226 East 144th Street, New York, is inquiring for a screw press for tool room use, No. 3 Bliss special or equivalent preferred.

The Cox Brass Mfg. Co., North Pearl Street, Albany, N. Y., has plans for a one-story addition to its foundry, 65 x 86 ft., to cost $45,000.

The Standard Parts Co., 4612 Woodward Avenue, Detroit, has leased for about six months the plant of the Moline Plow Co., Poughkeepsie, N. Y., at which the latter is now discontinuing operations. The Standard company will use the works for the production of parts for harvesting machines, for which it is said to have a contract with the Moline company.

The Empire Fireproof Door Co., 435 Southern Boulevard, New York, will soon take bids for a two-story addition. J. M. Latz, company address, is architect.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Jan. 29, for 10,000 cans, each 1-gal. capacity, for the Brooklyn Navy Yard, schedule 1760.

The Automobile Clock Co., 144 West Eighteenth Street, New York, has inquiries out for a punch press, Bliss or V. & O. type.

The Latin American Trading Co., P. O. Box 2176 Havana, Cuba, is desirous of receiving information and prices on machinery for the manufacture of talcum powder and kindred specialties; also to get in touch with manufacturers of cans and metal tubes for such products.

Erwin Egli, 62 Rue de Louvain, Brussels, Belgium, exporter and importer, is in the market for a quantity of machinery for textile and affiliated service, including carding machines, cleaning and mixing machines, cotton-opening equipment, spinning machinery, etc.

The Town Council, Iditarod, Alaska, is considering plans for a municipal electric plant.

Thomas A. Digan, Inc., 656 Third Avenue, Brooklyn, steamship supplies, will commence the construction of a two-story and basement cold storage plant, 50 x 100 ft., on Thirty-ninth Street, near Third Avenue. David M. Ach, 1 Madison Avenue, New York, is architect.

Saltser & Weinsier, 173-75 Cook Street, Brooklyn, plumbing equipment and supplies, have plans for a one-story works, 95 x 103 ft., on Flushing Avenue. Tobias Goldstone, 50 Graham Avenue, is architect.

The Department of Plant and Structures, Municipal Building, New York, has awarded a general contract to the Turner Construction Co., 242 Madison Avenue, for the erection of a ten-story building at Avenue C and Sixteenth Street for the Department of Street Cleaning, estimated to cost $3,500,000, of which three or more floors will be equipped as a central machine and repair works for motor trucks, cars and other equipment, replacing a one and two-story repair plant originally projected. G. A. Whalen is commissioner.

Cannava & Vivani, 145 West Forty-first Street, New York, architects, have plans in preparation for a two-story automobile service and repair building, on Ninety-first Street, near First Avenue, for A. B. Fleck, Inc., to cost approximately $250,000, with equipment.

The Edward F. Keating Co., 446 Water Street, New

York, manufacturer of pipe, pipe fittings, etc., has filed plans for a one-story addition at 183-87 Cherry Street, 60 x 75 ft., to cost $30,000. Mott B. Schmidt, 14 East Forty-sixth Street, is architect.

Fire, Jan. 8, destroyed the five-story plant of the New York & Brooklyn Casket Co., 160 East 126th Street, New York, with loss estimated at more than $200,000, including equipment. It is planned to rebuild.

The property of the Oscar Cling Cutlery Corporation, formerly operating a plant at Elmhurst, L. I., with New York sales department at 28 West Forty-fourth Street, has been acquired by new interests, headed by Wilkes-Barre, Pa., men. It is proposed to reorganize the company and resume the manufacture of patent scissors, as previously made by the Cling company.

M. N. Higgins, Inc., 488 Valley Road, West Orange, N. J., is taking bids for a one-story addition to its ice-manufacturing plant, 53 x 105 ft., to cost $35,000. John Decker, 19 Ridgeview Avenue, is architect.

The American Typefounders Co., Communipaw Avenue, Jersey City, N. J., is disposing of a stock issue of $2,000,000, a portion of the proceeds to be used in connection with its new plant at Elizabeth, N. J., now in course of construction, for the manufacture of printing press equipment. Robert W. Nelson is president.

The Common Council, Park Ridge, N. J., will take bids about Feb. 15 for the construction of two pumping plants, steel standpipe and other structures for a municipal waterworks. H. J. Harder, 129 Market Street, Paterson, N. J., is engineer.

Manual training equipment will be installed in the new memorial high school to be erected at Millville, N. J., estimated to cost $375,000, for which bids are being asked on a general contract until Jan. 30.

The National Fireproofing Co., Fulton Building, Pittsburgh, has engaged Sidney F. Heckert, Bessemer Building, architect, to prepare plans for rebuilding its hollow tile manufacturing plant at Perth Amboy, N. J., destroyed by fire with loss approximating $300,000. H. M. Keasbey is president.

The Croker-Wheeler Co., Ampere, N. J., manufacturer of electrical machinery, has disposed of its foundry and equipment at the foot of Rome Street, Newark, acquired during the war for the manufacture of gray iron castings. The new owners, whose names are temporarily withheld, are organizing a company to operate the plant.

The Universal Tobacco Machine Co., 196 Mount Pleasant Avenue, Newark, is in the market for the manufacture and sale rights of a patented article requiring the facilities of a metal-working and machine shop, particularly an article susceptible to quantity production and distribution. G. H. Jackson is in charge.

The Breeze Metal Hose Co., 250 South Street, Newark, has placed its two-story plant on the market and is said to be planning to re-establish the works at another location. Coleman S. O'Laughlin is president.

The Newark Fire Proof Sash Door Co., 138 Avon Avenue, Newark, will take bids for a two-story addition, 40 x 100 ft., to cost about $28,000; also for a one-story extension 25 x 75 ft. M. A. Wolff, 845 Broad Street, is architect.

The Oraton Investment Co., 213-31 South Eighteenth Street, East Orange, N. J., will commence the erection of a one-story ice-manufacturing plant to cost about $80,000. M. N. Shoemaker, 15 Central Avenue, Newark, is architect and engineer.

The Progressive Paper Box Co., 27 Seventeenth Avenue, Newark, has filed plans for a new factory at 341-55 Jelliff Avenue estimated to cost $90,000 with machinery. It is understood that the present works will be removed to the new location.

The Pyrene Mfg. Co., 520 Belmont Avenue, Newark, manufacturer of fire extinguishers, has filed plans for new works at 109-13 Meeker Avenue to cost approximately $90,000 with equipment.

The Common Council, Garfield, N. J., will take bids for a one-story municipal automobile repair works, for which plans have been drawn by Henry Garritsen, 118 Passaic Avenue, architect.

The Lehigh Valley Harbor Terminal Railway Co., Jersey City, N. J., operated by the Lehigh Valley Railroad Co., will build in the future two additional units at its Claremont Terminal, Greenville section, consisting of piers, warehouses and other buildings, with traveling cranes and cargo-handling and conveying equipment, duplicating the first unit. The company has issued bonds for $10,000,000, a portion of the proceeds to be used for the expansion. E. E. Loomis is president.

Buffalo

BUFFALO, Jan. 14.

BIDS are being taken by the American Laundry Machinery Co., West Avenue, Rochester, N. Y., for a one-story foundry and pattern shop, 80 x 100 ft. John Strobel, 622 E. & B. Building, is architect.

The Edwin A. Cook Wagon Works, 77 East North Street, Buffalo, has plans for a one-story addition. It is proposed to install a lathe, hammer, welding apparatus and other equipment. Edwin A. Cook is head.

The Kensington-Davis Corporation, 144 Kensington Avenue, Buffalo, has been denied permission by the City Council to erect a one-story foundry addition to cost $125,000, and the project will be held in abeyance pending negotiations.

Arrangements are being made by Stewart Hancock, receiver for the Sizer Forge Corporation, Larkin Street, Buffalo, for the sale of the property of the company, including the branch works at Syracuse, N. Y. The company has been operating under a receivership since July last.

The National Biscuit Co., 245 Urban Street, Buffalo, will commence the erection of a one-story service and repair works for company trucks and automobiles, estimated to cost $50,000.

The A. E. Baxter Engineering Co., Ellicott Square, Buffalo, is completing plans for the construction of a large cereal mill at South Africa for Collier & Son, London, England, and Capetown, S. A., to include elevator with equipment for 400,000 bu. capacity, power house and machine shop.

Plans have been drawn for a one-story power house at the plant of the Star Dry Cleaning Co., 1205 West Genesee Street, Syracuse, N. Y., to cost about $30,000.

The St. Regis Paper Co., Watertown, N. Y., is perfecting plans for a new paper and pulp mill near St. Augustin, Que., with power plant, estimated to cost $3,500,000.

Philadelphia

PHILADELPHIA, Jan. 14.

THE board of directors, State Hospital, Phillipsburg, Pa., is taking bids until Jan. 25 for a power house and mechanical laundry. George S. Idell, 1705 Chestnut Street, Philadelphia, is architect.

The Atwater-Kent Mfg. Works, Inc., 4937 Stenton Avenue, Philadelphia, manufacturer of wireless instruments, ignition equipment, etc., has acquired 7 acres of land on Abbottsford Road and Wisshickon Avenue as a site for a new plant.

Bids are being taken by the Ford Motor Co., Highland Park, Detroit, on general contract, for its proposed assembly plant at Sixty-third Street and Schuylkill Avenue, Philadelphia, to cost $350,000 with equipment. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Jan. 29 for 3250 lb. of copper tubing for the Philadelphia Navy Yard schedule 1766.

John F. Brown, Fifteenth and Chestnut Streets, Philadelphia, has filed plans for an automobile service and repair building at Thirty-second and Arch Streets, estimated to cost $250,000 with equipment. Horace W. Castor, St. Girard Building, is architect.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, is taking bids on a general contract until Jan. 18 for an addition to its power house at Fifty-sixth and Race Streets and improvements in the present station. John T. Windrim, Commonwealth Building, is architect.

M. Schmitz, Philadelphia, operating a machine shop at 492 North Third Street, has filed plans for a one-story addition to cost $12,000.

The Joseph Campbell Co., Camden, N. J., has preliminary plans for additions to its canned food products plant, estimated to cost $650,000.

The Thomas Maddock's Sons Co., Perry and Ewing Streets, Trenton, manufacturer of sanitary ware, has acquired property at Hutchinson Mills, Hamilton Township, near Trenton, for new plant estimated to cost $400,000 and will remove to the new location. A. M. Maddock is president, and C. S. Maddock, treasurer.

Fire, Jan. 6, destroyed the automobile assembling plant of the Cressona Wagon Works, Pottsville, Pa., used primarily for commercial machines, with loss estimated at $100,000 including equipment and stock. It is planned to rebuild.

The Reading Hardware Co., Reading, Pa., is having plans drawn for a one-story power house, 83 x 90 ft., adjoining its recently completed foundry, to cost $50,000. The Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect.

The Crane Market

THERE are a number of inquiries for locomotive cranes that promise to develop into a fair volume of business before long. Very few current orders, however, are noted. In electric overhead and hand power cranes the volume of new inquiry is small, but there are still a fair number of orders pending. Neither of the two large inquiries for locomotive and overhead cranes has been closed; the Baltimore & Ohio Railroad tender for six locomotive cranes and the Western Electric Co. inquiry for six overhead cranes. Among the fair sized Government tenders, on which bids are being submitted, is one from the United States Engineers' Office, Florence, Ala., for a 150-ton electric traveling crane for the new power plant at Wilson Dam, Muscle Shoals, bids opening Feb. 7, and a tender from the United States Engineers' Office, Milwaukee, Wis., for a revolving steel crane, bids opening Jan. 22.

Among recent purchases are:

Fagan Iron Works, Jersey City, N. J., two 5-ton, 23-ft. span, 3-motor, overhead traveling cranes from the Shepard Electric Crane & Hoist Co.

Paul S. Reeves & Co., Philadelphia, a 5-ton, 18-ft. span, 1-motor, single I beam crane from the Shepard Electric Crane & Hoist Co.

David E. Allen, Yonkers, N. Y., a 6-ton, 3-motor, overhead traveling crane from the Whiting Corporation.

Wood Brothers Construction Co., Lincoln, Neb., a 10-ton hand power crane from the Whiting Corporation.

Standard Seamless Tube Co., Economy, Pa., a 10-ton, 76-ft. 11½-in. span, overhead crane from the Milwaukee Electric Crane & Mfg. Co.

Weirton Steel Co., Weirton, W. Va., a 10-ton, 73-ft. span crane from the Morgan Engineering Co.

Union Steel Casting Co., Pittsburgh, a 5-ton, 40-ft. span, 3-motor, overhead crane from the Northern Engineering Works.

Railway & Industrial Engineering Co., Greensburg, Pa., a 5-ton, 38-ft. span, overhead crane from the Northern Engineering Works.

Sawbrook Steel Casting Co., Cincinnati, two 5-ton, 40-ft. span, 3-motor, overhead cranes from the Northern Engineering Works.

Central Steel Co., Economy, Pa., a 10-ton crane, duplication of existing installation, from the Alliance Machine Co.

Commonwealth Edison Co., Chicago, a 60-ton erection crane from the Industrial Works.

The D. M. Bare Co., Roaring Spring, Pa., has plans for extensions and the installation of additional machinery estimated to cost $100,000. E. G. Bobb is general manager.

The Air Reduction Sales Co., 342 Madison Avenue, New York, manufacturer of industrial oxygen, oxy-acetylene apparatus, etc., has tentative plans for a new plant at Harrisburg, Pa., estimated to cost $250,000 with equipment.

The Anthracite Chain & Engineering Co., Hazleton, Pa., has beeen granted a State charter, with capital of $50,000. Plans are under way for a factory to manufacture chains and kindred products. E. D. Snyder, 537 West Diamond Street, is treasurer.

The Avoca Washery, Avoca, Pa., operating a coal washery, has plans for new works estimated to cost $80,000 with machinery.

The General Paper Co., Beaver Dam, Pa., will electrify its plant in all departments, replacing steam-operated equipment. Central station service will be furnished by the Chester Valley Electric Co.

The Carrahan Canning Co., Inc., Bloomsburg, Pa., will install machinery and transmission equipment to cost about $21,000 at its new plant in course of erection.

The Pennsylvania Edison Co., Easton, Pa., is preparing to begin construction in the spring on its hydroelectric generating plant on the Delaware River, near Riegelsville, Pa., estimated to cost $3,500,000 with equipment and transmission apparatus.

New England

BOSTON, Jan 14.

HALF of the month of January has passed without any material change in the New England machine-tool market. Buying of equipment is practically at a standstill, but is expected to slowly expand from now on. No new prospects of importance have developed, but the trade has a considerable amount of business in view held over from 1923.

The National Machine Tool Builders' Association, Cincinnati, is authority for the following statement: "The prospects for the machine tool industry this year as we view it are for neither very good business, nor very bad business. The industry is operating at approximately 40 per cent of capacity. Stocks of goods on hand seem to be ample to take care of all reasonable demand. Customers are buying quite conservatively. As to the labor situation, we think there is ample labor to take care of consumption needs in this country. Unless business men begin speculating in commodities, and ordering more from the manufacturers than consumers are actually taking, the labor condition ought to continue good with reasonable employment for all who are willing to work. But if business men become too enthusiastic, they are going to over-order, and consequently will temporarily increase the labor demand, which will have an effect on wages without any doubt."

An auction sale of machine tools and accessories was conducted by Herbert Segal, Inc., Newark, N. J., at the automobile plant of the Stevens-Duryea Co., Chicopee Falls, Mass., on Jan. 9 and 10. The sale was attended by more than 400 persons and there were 211 buyers. The smallest sale to one buyer was $1 and the largest item was $19,044. Nearly 2000 items were sold in two days. Mr. Segal remarked after the sale that the individual prices received, as compared with prices recently on similar tools, point to a rising market for machine tools.

Bids closed Jan. 12 for a two-story 150 x 160 ft. and wing 33 x 160 ft. automobile service station to be erected at North Beacon and Arthur Streets, Brighton, Boston, by the Mack Motor Truck Co., 185 Massachusetts Avenue, Cambridge. The Warren Engineering Corporation, 50 Terminal Street, Charlestown, Mass., made the plans.

The Fitzgerald Mfg. Co., Winsted and Torrington, Conn., motors, gaskets and automobile accessories, is completing additional manufacturing space at Winsted to increase its motor output 1000 per day and to double its gasket production. The company has a branch plant at Toronto, Ont.

The Aetna Steel & Iron Co., Southington, Conn., has been incorporated with a capitalization of $150,000 to eventually take over the Aetna Rolling Mill property. New equipment will be required.

Conveying machinery will be required for a one-story, 60 x 200 ft. paper mill contemplated by Morris Manes, 138 Church Street, North Adams, Mass., to be erected at Pownal, Vt. The engineer has not been selected.

Plans are in progress for a three-story, 152 x 226 ft. New Bedford, Mass., high school addition on Country and Morgan Streets, to cost $200,000 and which will contain a machine shop. Napoleon Ricard, 220 Municipal Building, is chairman of the city property commission. Browne & Poole, 688 Pleasant Street, New Bedford, are the architects.

Bids have closed for the $450,000 Phillips Brooks District School, Lawrence Avenue and Fernboro Street, Roxbury, Boston, which will contain wood-working and metal working shops and manual training rooms. Thomas P. Glynn, chairman of the schoolhouse commission, is in charge of the project. Gray & Co., 175 High Street, Boston, are the architects.

Belting, shafting, etc., are required for a one-story 40 x 150 ft. manufacturing plant to be erected on Belgrade Avenue, Roslindale, Boston, by O. F. Oakes, 11 Aldworth Street, Jamaica Plain, plans for which are in progress. James Murray, 101 Tremont Street, Boston, is the architect.

The Elliott Addressing Machine Co., 143 Albany Street, Cambridge, Mass., has awarded a general contract to the William M. Bailey Co., Boston, for a five-story addition, 40 x 90 ft., estimated to cost $75,000.

Ovens, power equipment, conveying and other machinery will be installed in the four-story plant, 70 x 130 ft., to be erected by the Berwick Cake Co., 2220 Washington Street, Roxbury, Boston, to cost $110,000. Charles T. Main, 200 Devonshire Street, is architect and engineer.

The Fafnir Bearing Co., New Britain, Conn., has acquired the factory previously occupied by the Hart & Cooley Mfg. Co. for extensions.

The Fitzgerald Mfg. Co., North Main Street, Torrington, Conn., manufacturer of automobile horns and kindred ac-

cessories, will commence the erection of a two-story addition, 50 x 200 ft

The Androscoggin Electric Co., Lewiston, Me., is arranging for a bond issue of $591,000, a portion of the proceeds to be used for extensions and improvements.

The Eastern Connecticut Light & Power Co., Jewett City, Conn., is planning the erection of a new power house at Griswold, Conn., estimated to cost $40,000.

The Adams Paper Co., Wells River, Vt., has plans for an addition estimated to cost $80,000 with equipment.

The City Commissioners, Hartford, Conn., have engaged Whiton & McMahon, 36 Pearl Street, architects, to prepare plans for a three-story repair, service and warehouse, 160 x 200 ft., for the Water Board, estimated to cost $100,000 including equipment.

The Waterbury Lumber Co., 60 Meadow Street, Waterbury, Conn., has plans for a new one and two-story power house.

Chicago

CHICAGO, Jan. 14.

HEAVIER buying by industrial companies, together with prospective additional purchases by the railroads, has increased the hopes of the local machine tool trade for a busy first quarter. The Automatic Electric Co., Chicago, has placed orders involving approximately $50,000, including 35 punch presses, 19 automatic screw machines, several hand screw machines, and 69 spindles of drill presses, some multiple spindle drills and others single spindle drills. The company is still figuring on the purchase of eight milling machines and a number of other tools. The Creamery Package Co., Chicago, has purchased a sensitive radial drill, a heavy duty drill, a small manufacturing lathe and a drill grinder. The Standard Oil Co. of Indiana has ordered a number of machines to replace those destroyed by fire at its Whiting, Ind., plant, among them a No. 2 milling machine, 4-ft. radial drill and an arbor press. The Pettibone-Mulliken Co., Chicago, has purchased a 60 x 72-in. x 20-ft. planer. The Chicago Board of Education has distributed order for machine tools for the Tilden Technical High School amounting to $15,000.

Among the railroads, the Santa Fe promises to be an important factor in the market during the year. It is expected to issue inquiries this week for its San Bernardino, Cal., shops, covering $250,000 worth of cranes and $250,000 worth of machine tools. This road's 1924 budget calls for a total expenditure of $500,000 for machine tools and approximately $300,000 for cranes. The Illinois Central and the Rock Island are also preparing lists, but it is not known definitely when they will be issued. The pending Union Pacific list for Los Angeles is expected to close at any time.

A few price changes are reported. The Monarch Machine Tool Co., Sidney, Ohio, will advance its line of engine lathes 10 per cent, effective Jan. 15. The Dreis & Krump Co., Chicago, raised its line of brakes 10 per cent Jan. 1. The Cincinnati Electrical Tool Co., manufacturer of portable electric drills, grinders and buffers, and floor grinders, published a new price list Jan. 10. This involved a general readjustment, some prices up and others down.

The Whiting Corporation, Harvey, Ill., has taken an order for a No. 5 cupola from the American Foundry & Machine Co., Hamilton, Ohio.

The Liberty Products Mfg. Co., 224 North Sheldon Street, Chicago, recently incorporated with $30,000 capital stock, manufactures a combination kick plate and safety light for automobiles. Officers are J. Rene Ayotte, president and engineer; Leo J. Biron, secretary and general manager, and Anna G. Offerman, treasurer and purchasing agent.

The Consumers Co., 111 West Washington Street, Chicago, has completed plans for an ice-manufacturing plant with 140 tons daily capacity, 1336 Dodge Avenue, Evanston, Ill., to cost $210,000.

The Blue Valley Creamery Co., 700 South Clinton Street, Chicago, has placed contract for a four-story creamery, 81 x 178 ft., 1139-1143 West Jackson Boulevard, to cost $240,000.

John R. Bowes, 30 North LaSalle Street, Chicago, has let contract for a one-story machine shop, 40 x 101 ft., at 406-408 North Hermitage Avenue, to cost $8,000.

The Elco Tool & Screw Corporation, Rockford, Ill., recently reorganized with $300,000 capital stock, manufactures wood screws in steel and brass with any plated finish specified by the consumer. Its business is chiefly with large consumers of wood screws in the automobile body building field and in the hardware and furniture industry. The company recently purchased a two-story brick plant with approximately 70,000 sq. ft. of floor space, and has sufficient adjacent property to cover future expansion. It does not contemplate purchasing additional equipment at this time, but recently installed approximately $70,000 worth of special wood screw manufacturing machinery. Officers are Levin Faust, president; C. G. Englund, vice-president; H. O. Swanson, secretary, and P. G. Swanson, treasurer.

The Piasa Tool Co., 291 Ashland Avenue, Aurora, Ill., recently incorporated with $21,000 capital stock, has begun the manufacture of roller skates, as well as dies, fine tools, special machinery, etc. It has contracted for the manufacture of its products with D. M. Humiston, 619 South Fourth Street, Aurora, who has a two-story shop, 30 x 48 ft., which has been operating since 1898. Officers are George L. Martin, president; R. E. Richards, vice-president; A. E. Applegate, secretary and treasurer, and D. M. Humiston, manager and superintendent.

A power house will be constructed by the Fulton Bag & Cotton Mills, Inc., Atlanta, Ga., at its new plant at Minneapolis, Minn., comprising two four-story units, estimated to cost $700,000. Frederick Kees, 246 Plymouth Building, Minneapolis, is architect.

The Paullina Electric Power Co., Paullina, Iowa, is planning to rebuild its power plant recently partially destroyed by fire with loss estimated at $40,000 including equipment.

The Belsky Motor Co., Sixth and Iowa Streets, Dubuque, Iowa, will commence the erection of a three-story service and repair works, 100 x 110 ft., to cost $200,000, including equipment.

F. M. Connolly, Galesburg, Ill., architect, has plans for the construction of a stone crushing works and power house at Plymouth, Ill., for which the owner's name is temporarily withheld, reported cost placed at $150,000 with equipment.

Milwaukee

MILWAUKEE, Jan. 14.

NEW projects involving shop construction and extensions are appearing with such frequency that the prospects for improved machine-tool business become more encouraging. Current trade represents considerable improvement over business in December. It is not yet brisk, but is covering a wider range of industries. Single tool or small lot needs dominate the market, with automotive industries the best source of business. Employment reports show that in December the iron, steel and machinery group made a gain over the previous month, while virtually all other groups declined in number at work.

The Milwaukee Structural Steel Co., Milwaukee, has started work on the construction of a complete new fabricating shop, 125 x 310 ft., on a new site at Fortieth and State Streets. It has been operating for many years at Nineteenth Street and St. Paul Avenue, and the equipment of this shop will be transferred to the new works. For the present only minor supplemental needs will be filled. These have not yet been detailed. It will require 300 tons of shapes, to be fabricated in the present shop. John F. Henry is president and general manager.

The Parker Pen Co., Janesville, Wis., manufacturer of fountain pens and metal pencils, has increased its capitalization from $1,500,000 to $2,000,000 to meet the increased value of assets and provide for further expansion. It is making frequent purchases of additional equipment and may erect an addition this year. Russell C. Parker is production manager

The Madison Gas & Electric Co., Madison, Wis., has engaged Mead & Seastone, Journal Building, local, as consulting engineers on a steam generating plant improvement project involving about $250,000. Requirements include two 1000-hp. boilers and one 5000-kw. turbine, contracts for which will be placed within a short time.

The United States Engineer's Office, Federal Building, Milwaukee, is asking bids until Jan. 22 on one revolving steel crane for harbor work barge equipment. Major Frederick S. Skinner is engineer in charge.

The Auto Truck Service Co., 308 North Avenue, Milwaukee, is buying some additional shop equipment for a new department to manufacture metal bodies and mechanical hoists for motor trucks.

The Wausau Abrasives Co., Wausau, Wis., manufacturer of grinding wheels, sand-paper and other abrasives for metal and wood working industries, is starting work on the construction of an addition to cost about $75,000 including equipment, for which inquiry is now being made. The factory and offices are at 1007 South Second Avenue, Wausau.

W. A. Russell, 565 Park Avenue, Kenosha, Wis., has plans by C. A. Augustine, local architect, for a two-story garage, with repair and service shop, 82 x 127 ft., estimated to cost $35,000. Bids will be taken about April 1.

The Prime Mfg. Co., 635 Clinton Street, Milwaukee, expects to take bids Feb. 1 for a new brass foundry costing about $65,000. Plans are being completed by Frank D. Chase, Inc., architect and engineer, 645 South Michigan Avenue, Chicago. The company manufactures railroad and automotive materials and supplies. H. G. Wild is secretary and treasurer.

The Board of Education, Lancaster, Wis., is asking for bids until Jan 29 for a new high and vocational training school designed by Parkinson & Dockendorff, architects, LaCrosse, Wis., and estimated to cost $275,000.

The J. Ruesch Machinery Co., Milwaukee, has been incorporated in Wisconsin with a capital consisting of 500 common shares without par value to manufacture, rebuild and deal in machinery and mechanical equipment. It is the outgrowth of the J. Ruesch Printing Machinery Co., 485 Broadway, Milwaukee.

The Algoma Wood Products Co., Algoma, Wis., has placed contracts for a two-story concrete and steel addition, 62 x 124 ft., to increase its output of fine furniture, and will be in the market for considerable new machinery. About $100,000 will be invested in building and equipment. M. Melchoir is president.

The Madison, Wis., Tool & Stamping Works, 1970 Helena Street, has purchased miscellaneous new machinery for a new department to give complete repair and replacement service to automobile and motor truck owners. It will continue the manufacture of stampings, tools, dies, jigs, fixtures and general machinery repair work.

Thee Milwaukee Department of Public Works, R. E. Stoelting, commissioner, is in the market for miscellaneous equipment, including the following: One electric motor-driven air compressor, three air compressors, one pump, two fans, three feed water regulators, one boiler feed pump, one crusher with motor and machinery, one 12-ton, one 8-ton and one 3-ton road rollers, one gasoline shovel, two 5-ton caterpillar tractors, 14 5-ton tractor trucks and numerous others.

Detroit

DETROIT, Jan. 14.

PLANS will soon be drawn by the Wolverine Porcelain Enamel Co., 3350 Scotten Street, Detroit, for an addition to cost $75,000 including equipment. The company is operated by the Porcelain Enamel & Mfg. Co., Baltimore.

The Moonlake Ice Co., 412 Douglas Street, Grand Rapids, Mich., will take bids before the close of the month for a one-story addition to its ice-manufacturing plant, 35 x 100 ft., to cost $40,000. The G. B. Bright Co., 103 Marquette Building, Detroit, is architect and engineer.

The Buick Motor Car Co., Flint, Mich., a subsidiary of the General Motors Corporation, Detroit, has authorized plans for additions, to include a main one-story general assembly works, 210 x 360 ft.; one-story motor-testing works, 50 x 125 ft.; one-story addition to heat-treating plant, 55 x 120 ft.; addition to sheet-metal plant, totaling 120,000 sq. ft.; one-story addition to tool-making plant, 80 x 240 ft.; and addition to completed car warehouse, 140 x 200 ft. A new three-story plant will be built for automatic screw machine work, 80 x 400 ft. The expansion will cost approximately $10,000,000 with machinery, including buildings now in course of erection. It is expected to have the entire expansion program completed by July. H. H. Bassett is president.

Manual training equipment will be installed in the two-story and basement high school to be erected at St. Johns, Mich., estimated to cost $250,000, for which bids will be received on a general contract until Feb. 1. S. D. Butterworth, Prudden Building, Lansing, Mich., is architect.

The Bissell Corporation, Grand Rapids, Mich., has been formed with a capital of $1,300,000 to take over and expand the Bissell Carpet Sweeper Co., specializing in the production of vacuum cleaners, carpet sweepers, etc. The new company is headed by Irving J. and M. R. Bissell.

Manual training equipment will be installed in the two-story high school to be erected at Jonesville, Mich., estimated to cost $110,000, for which bids are being taken on a general contract. Ernest S. Batterson, 405 Hanselman Building, Kalamazoo, Mich., is architect.

The Towson Body Co., Aberle Street, Detroit, has work in progress on a six-story plant for the manufacture of automobile bodies, to cost in excess of $175,000, and will soon arrange a list of equipment.

E. J. Kovach, 3513 Woodward Avenue, Detroit, consulting engineer, has inquiries out for machine tools and equipment for a general machine shop.

The Clover Foundry Co., Clay Avenue and Eleventh Street, Muskegon, Mich., plans to erect an addition which will double its capacity of 25 tons of automotive castings daily. It now occupies a plant 100 x 225 ft.

Pittsburgh

PITTSBURGH, Jan. 14.

OPTIMISTS in the local machine-tool trade find discouragement in the fact that the month is about half gone and not much business has developed. The more general feeling, however, is that buying was not expected in volume before the middle of the month as inventories must take precedence. Inquiry still is good and so much business is pending that the majority in the trade feel that if half of it is placed the year will be reasonably satisfactory. Plans of practically all steel companies in this district are extensive and involve large expenditures, reflection of which is seen in the crane market, builders at present figuring against more inquiries than since the war period.

Plans are being arranged by the Anchor Drawn Steel Co., Latrobe, Pa., for a new plant, one-story, 80 x 290 ft., with L-extension, 50 x 120 ft., and smaller buildings. It will be used for the manufacture of carbon steel drill rods and other cold drawn steel products.

The Dixon Motor Co., 109 West Montgomery Avenue, Pittsburgh, will commence the erection of a three-story addition to its service and repair works, to cost $25,000 exclusive of equipment.

The Erie Cabinet & Construction Co., 641 West Eighteenth Street, Erie, Pa., plans for the installation of lathes and other woodworking machinery, and transmission equipment. M. Strohmeyer is head.

The Monongahela-West Penn Public Service Co., Clarksburg, W. Va., a subsidiary of the West Penn Co., West Penn Building, Pittsburgh, has plans for a local power house to cost approximately $75,000, on which work will commence at once.

The Wheeling Coal Co., Wheeling, W. Va., will commence the erection of a steel tipple at its property near Warwood, W. Va. It will have a capacity of 2500 tons per day, and will cost more than $150,000. The work will be in charge of the Fairmont Mining & Machine Co., Fairmont, W. Va. The Wheeling company recently increased its capital from $300,000 to $1,000,000 for expansion, and will buy other machinery and power equipment later. Frank Costanzo is president.

The Daniel Boone Mining Machine Co., Beckley, W. Va., is planning for a three-story and basement machine works, 60 x 80 ft., estimated to cost $50,000. Daniel Boone is general manager.

The West Virginia Chemical Co., Fairmont, W. Va., manufacturer of fertilizer products, etc., has plans for an addition on the Tygart's Valley River, with electric power department. It will cost about $75,000. W. C. McAdoo is general manager.

Manual training equipment will be installed in the two-story and basement senior and junior high school to be erected at Beckley, W. Va., estimated to cost $200,000, for which bids will soon be asked on a general contract. William B. Ittner, Board of Education Building, St. Louis, is architect.

The Blair Strip Steel Co., New Castle, Pa., has taken out a State charter with capital of $100,000, and 100,000 shares of stock, no par value. Plans are nearing completion for a new works to manufacture cold rolled and high tempered steel products, estimated to cost $80,000. George D. Blair, Sr. and Jr., and J. Norman Martin, all of New Castle, head the company.

Manual training equipment will be installed in the proposed Douglas senior and junior high school to be erected at Huntington, W. Va., estimated to cost $140,000, for which bids will soon be asked on revised plans. W. Francis Diehl, R. & P. Building, is architect.

The Midwest Box Co., 1845 Conway Building, Chicago, has tentative plans for an addition to its plant at Fairmont, W. Va., to cost $75,000, including the installation of additional equipment in existing works.

Manual training equipment will be installed in the new high school to be erected at Sewickley, Pa., estimated to cost $250,000, for which bids will be asked on a general contract in the near future. Press C. Dowler, Magee Building, Pittsburgh, is architect.

The Elkhorn Motor Co., Pocahontas, Va., H. W. Hicks, head, has plans for a new service and repair building at Keystone, W. Va., with foundations for additional stories later. Bids will be asked about Feb. 15. The machine shop will include tools for repair of Ford automobiles.

The Rum Creek Coal Co., Logan, W. Va., recently organized, plans the installation of electric power and mining machinery on local property. F. P. Chambers and R. C. Newman, both of Charleston, W. Va., head the company.

Cleveland

CLEVELAND, Jan. 14.

SOME local machine tool builders did a fair volume of business the past week but dealers' sales were light and little came out in the way of new inquiry. The Ford Motor Co. placed five or six large turret lathes with a Cleveland manufacturer. The latter company also booked scattered orders for several small machines for brass working shops and has a large number of inquiries pending for one or two machines. Another local manufacturer took orders for two angle shears and punching machines from the Minneapolis Steel & Machinery Co., Minneapolis, and a set of bending rolls from the Smith-Hamburg-Scott Welding Co., Long Island City, N. Y. Sales of German punching and shearing machines have been made in this country recently in competition with American machines.

The American Crucible Products Co., Elyria, Ohio, has under erection a 24 x 50 ft. addition and when this is completed will erect another building for a core making department.

The Galion Iron & Mfg. Co., Galion, Ohio, has revised its plans for a foundry extension and will take bids in the spring for a one-story building, 50 x 160 ft., or rouble the size of the structure that had originally been planned. Althous & Jones, Market Building, Mansfield, Ohio, are engineers.

The C. O. Bartlett & Snow Co., Cleveland, has recently taken orders for sand handling equipment for the Detroit foundry of the Griffin Wheel Co. and for the Neptune Meter Co., Long Island City, N. Y.

The Union Drawn Steel Co., Beaver Falls, Pa., is contemplating the erection of a warehouse in Cleveland. F. C. Young, 708 Rockefeller Building, is the district sales manager.

J. Edward Strater, dealer in automobile supplies, 13237 Superior Road, Cleveland, will erect a factory on Woodworth Road. Henry Whitworth, 526 Hickox Building, is the architect.

The Standard Oil Co. is contemplating the erection of a $2,000,000 refinery in Toledo, Ohio.

St. Louis

ST. LOUIS, Jan. 14.

THE St. Louis Steel Castings Co., 3432 Potomac Street, St. Louis, recently organized to manufacture commercial steel castings, has let contracts for the construction of a main foundry building, 80 x 116 ft., and, while much of the equipment has been purchased, the company is still in the market for some of the smaller equipment needed in the foundry. Joseph Teipel is president.

The Southern Wheel Co., 611 Olive Street, St. Louis, has commenced the construction of its plant on property acquired at Portsmouth, Va., consisting of a one-story unit, 90 x 340 ft., and smaller buildings, with power house, estimated to cost $100,000.

The Woodchuck Lead & Zinc Co., Cardin, Okla., has tentative plans for rebuilding the portion of its zinc mill recently destroyed by fire with loss estimated at $100,000, including machinery.

The Oklahoma Union Railway Co., Tulsa, Okla., is planning the construction of car repair shops and power house in connection with extension of its line from Kiefer to Okmulgee and Bristow, Okla., also belt line from East Tulsa to West Tulsa with power house, estimated to cost $150,000.

The Downtown Garage, St. Louis, care of the George E. Wells Engineering Co., Boatmen's Bank Building, engineer, will install a machine and repair shop in its proposed three-story service and garage building, 137 x 175 ft., at Seventh and Franklin Streets, estimated to cost $300,000. W. L. Allen is president and general manager.

The Continental Gas & Electric Corporation, Omaha, Neb., has acquired a controlling interest in the Kansas City Power & Light Co., Kansas City, Mo. The new owner has tentative plans for extensions and the installation of additional equipment. C. S. Eaton, Cleveland, is chairman of the board of the purchasing company.

Weldon, Williams & Lick, 711 North A Street, Fort Smith, Ark., manufacturer of office equipment and supplies, is planning the erection of an addition to cost $45,000 including machinery.

Bids will be received by the Common Council, Ava, Mo., J. E. Curry, clerk, until Jan. 24 for deep-well pumping machinery, water tower and tank, to be installed at the new waterworks station. Russel & Anan, McDaniel Building, Springfield, Mo., are engineers.

The Empire Refineries, Inc., Ponca City, Okla., has tentative plans for enlargements in its oil refinery and the installation of additional machinery to cost $85,000.

The National Asphalt Co., Nevada, Mo., is perfecting plans for new works with equipment to approximate $70,000, including crushing machinery, breakers, rolls, mixing and conveying apparatus. P. C. Hansen is one of the heads of the company.

The Diamond Refining Co., Tulsa, Okla., has acquired the oil refinery of the Kansas Refining Co., at Coffeyville, Kan., for about $650,000. The new owner will remodel the plant and install additional machinery.

The Joseph Lyons Machinery Co., 112 North Louisiana Street, Little Rock, Ark., desires to get in touch with manufacturers of small steam engines, up to about 10 hp.

I. W. Rogers and H. E. Springer, Poplar Bluff, Mo., plan the construction of a power house at their proposed ore concentrating mill near Taskee Station, Mo. The installation will also include a mechanical washing plant and tramway. The entire project will cost about $200,000.

The Sac River Light & Power Co., Humansville, Mo., is planning for extensions in its plant and system and the installation of additional equipment.

Cincinnati

CINCINNATI, Jan. 14.

BUYING of machine tools continues in fair volume, and satisfaction is expressed by manufacturers with the number of orders received and inquiries pending. The Westinghouse Electric & Mfg. Co. was a large buyer the past week, and the Union Pacific Railroad commenced placing orders on its recent list. The Southern Railway also completed its purchase of tools issued last month. Industrial buying continues at a good rate. The General Electric Co. is expected to close this week on tools for its West Philadelphia plant, and the New York Central Railroad is also expected to continue its purchases and has added a number of tools to its list. An order for five engine lathes was placed with a local manufacturer the past week.

The only new list reported is from the Olds Motor Works, Lansing Mich., which has inquired for miscellaneous machine tools. The Crosley Mfg. Co., Cincinnati, has closed for several small tools for its radio manufacturing plant.

A revised price list of the National Automatic Tool Co., Richmond, Ind., shows a reduction of approximately 10 per cent.

The Miami Ice & Fuel Co., Dayton, Ohio, will shortly commence the erection of a five-story cold storage plant having a floor space of 300,000 sq. ft. and costing approximately $300,000.

The Hamilton Sheet Metal Co., Hamilton, Ohio, has plans for the erection of an addition and will install metal working machinery.

The Duro Pump & Mfg. Co., Dayton, Ohio, will soon call for bids for the erection of an addition to cost $175,000. Machinery to cost $30,000 will be installed. Schenck & Williams, Dayton, Ohio, are architects.

The City Council, Owensboro, Ky., has tentative plans for extensions and improvements in the municipal electric light and power plant estimated to cost $100,000 including equipment. W. M. Watson, Ovensboro, is engineer.

In connection with the rebuilding of its plant recently destroyed by fire the Tennessee Enameling Co., Charl Park, Nashville, Tenn., is planning for the installation of equipment to cost about $40,000, including shears, punches, enameling furnaces, transmission apparatus, etc. It will be 95 x 180 ft., and will cost $25,000 exclusive of equipment. M. H. Wright is president.

The Kentucky Utilities Co., Louisville, is disposing of a bond issue of $2,000,000, a portion of the proceeds to be used for extensions in generating plant and system, including additional equipment. Harry Reid is president.

The Southern Cities Power Co., Chattanooga, Tenn., has acquired the Mount Pleasant Electric Co., Mount Pleasant, Tenn., and the Harpeth Electric Light & Power Co., Franklin, Tenn., and will consolidate the properties. Plans are under way for extensions, including remodeling the hydro-electric generating plant at Columbia, Tenn., and the installation of additional machinery, with construction of new transmission lines.

Metal and wood-working machinery, trucks, stock, fixtures, etc., of the Bahmann Iron Works Co., Dayton, Ohio, also the foundry and equipment, buildings and real estate, will be sold on the premises, Jan. 30, by the Effron Co., auctioneer, 7 West Third Street, Cincinnati.

The Hold-Pack Mfg. Co., Dayton, Tenn., has leased a building and will establish a plant for the production of metal fasteners for round shipping baskets, with installation to include a stamping machine, machine for forming 14 gage wire, stapling machines, etc. W. E. Morgan is head.

J. L. Humphreys, Knoxville, Tenn., plans the installation of an ice and refrigerating plant at his proposed market building at North Knoxville estimated to cost $200,000.

The Ford Motor Co., Highland Park, Detroit, is taking bids for its proposed assembly plant on 20-acre site recently acquired at Louisville, with main unit, 300 x 1000 ft., and power house, estimated to cost $1,000,000 with machinery. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Burdett Oxygen Co., Chattanooga, Tenn., has purchased a site at Knoxville, Tenn., and will have plans drawn for a new plant estimated to cost $100,000 with machinery. It will include a power house. E. A. Faulhaber is vice-president.

South Atlantic States

BALTIMORE, Jan. 14.

A PORTION of the plant of the Columbia Graphophone Co., Baltimore, has been leased by the Chevrolet Motor Co., General Motors Building, Detroit, for a factory branch and distributing plant

The Bostwick-Lyon Bronze Co., Waynesboro, Pa., has acquired the plant of the Maryland Smelting & Refining Co., Hagerstown, Md. It is said that the purchase has been made in the interests of the Chicago Bearing Metal Co., 2234 West Forty-third Street, Chicago, an associated organization, for branch works. W. S. Bostwick and Chester A. Lyon head the purchasing company.

The Anthracite Fuel Corporation, 706 Continental Building, Baltimore, will commence the erection of a fuel briquette plant on a 3-acre tract on Eighth Street, with power house, estimated to cost $200,000 with machinery. F. A. Weymouth is president.

Manual training equipment will be installed in the two and one-half story high school to be erected at Claymont, Del., estimated to cost $275,000, for which bids will be asked at once on a general contract. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

The Common Council, Hancock, Md., is in the market for centrifugal pumping machinery, tank and other equipment for proposed waterworks expansion.

The Bureau of Yards and Docks, Navy Department, Washington, will soon take bids for high frequency induction furnaces and converting equipment for the Bellevue, D. C., naval station, specification 4933.

The Central of Georgia Railway Co., Savannah, Ga., has plans for a one-story car repair and coach shop, 200 x 200 ft., to replace the portion of the plant destroyed last November with loss of about $400,000 including equipment. Bids will be asked in February. C. K. Lawrence is chief engineer.

J. William Firor, County agent, Cooperative Extension Work in Agriculture and Home Economics, State of Georgia, 170 King Avenue, Athens, Ga., desires to get in touch with manufacturers of machinery for the production of handles for shovels, brushes, etc., with view to purchasing equipment.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a company at Montevideo, Uruguay, in the market for American conveying equipment for handling kerosene in cans, No. 8785; of a company at Worcester, England, desirous of purchasing stamping machinery, No. 8791; a company at Para, Brazil, in the market for machinery for the manufacture of cardboard, No. 8775; a company at Stockholm, Sweden, in the market for 25 to 100 airplane engines, 400-hp. Liberty type, No. 8731; a concern at Prague, Czechoslovakia, in the market for small metal-working tools, No. 8763.

The Board of District Commissioners, District Building, Washington, will take bids until Jan. 21 for 128 steel lockers, 18 x 72 in., 5-in. legs, for use in the Gallinger Hospital.

The Virginia Railway & Power Co., Norfolk, Va., is arranging an appropriation of $550,000 for extensions in its power plant and system, and the installation of a 15,000-kw. alternator and auxiliary equipment at the local power station, estimated at $400,000; underfeed mechanical stokers and other boiler room equipment, and the erection of a power substation in the Fairmount Park section.

Bids will be received until Jan. 24 by J. O. Duval, town clerk, Greenville, S. C., for one 1250-kw. steam turbo-generator unit with auxiliary apparatus; switchboard and other equipment for a municipal power plant. Edward E. Williams, Greenville, is engineer.

The Chief of Engineers, United States Army, 2825 Munitions Building, Washington, will take bids until Jan. 28 for nine blowers, two propeller fans, and four speed blowers, motor-driven.

Fire, Jan. 4, destroyed the lumber mill and plant of L. A. Poehlmann & Sons, 3401 Frederick Avenue, Baltimore, with loss estimated at $200,000 including equipment. It is planned to rebuild.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for a number of transformers, 10 to 20 kva., 220-volt high tension, 220-volt low tension; lathe, 24 in. swing and 6 ft. bed; emery wheel; band saw outfit, and power hacksaw; one sheet cutter, Seybold type or similar; one water-tower tank unit with tower 15 to 20 ft. high.

Bids will be received by the general purchasing officer, Panama Canal, Washington, until Feb. 1 for reamers, drills, taps, files, chisels, shovels, hacksaw blades, chains, unions, valves, etc., circular 1584; until Jan. 23 for stocks and dies, reamers, pliers, tinners' shears, pipe tongs, monkey wrenches, screw clamps, vises, etc.

The Municipal Service Co., Land Title Building, Philadelphia, has acquired the plant and property of the Ware County Light & Power Co, Waycross, Ga. Plans are under consideration for extensions and the installation of additional equipment.

The American Chemical Co., Silver Creek, Ga., plans the construction of a power house at its proposed plant estimated to cost $100,000. Joel Perkinson, Chattanooga, Tenn., is in charge of construction.

The General Elevator Co., 400 South Charles Street, Baltimore, has acquired property at Bush, Ridgely and Russell Streets as a site for a new plant which will contain 15,000 sq. ft. of floor space and cost $60,000.

The former plant of the Drop Forge & Mfg. Co., Carroll Park, Baltimore, has been leased by the Lyk Glass Corporation, 940 Linden Avenue, and after alterations will be used as an automobile painting factory with a minimum of 10 cars daily. George H. Martin is vice-president of the Lyk Glass Corporation.

Indiana

INDIANAPOLIS, Jan. 14.

D. M. GORDON, Metamora, Ind., operating a woodworking plant, plans the installation of additional equipment, including a lathe, rip saw, cutting-off machine and transmission equipment.

The Calumet Electric Co., Gary, Ind., is concluding negotiations for the purchase of the property of the Interstate Public Service Co., Crown Point, Ind., and vicinity, for $260,000. The new owner plans extensions and the installation of additional equipment.

The Wabash Railroad Co., St. Louis, is planning the construction of new locomotive and car repair shops near the city limits, Peru, Ind., recently secured. It is purposed to remove the present Peru shops to the new location, installing considerable additional machinery and power equipment. The project is estimated to cost $1,000,000.

The C. P. Lesh Paper Co., 121-25 Kentucky Avenue, Indianapolis, has acquired property at Senate Avenue and New York Street for new works to more than triple the present floor space. C. P. Lesh is president.

A power house and refrigerating plant will be installed in the new two-story municipal market to be erected by the City Council, Richmond, Ind., 82 x 375 ft., including assembly hall, estimated to cost $250,000. Werking & Son, 307 American Trust & Savings Building, are architects.

The Goshen Lightning Rod Co., Goshen, Ind., has acquired the plant and business of the Diamond Cable Co., Bourbon, Ind., manufacturer of kindred products. The latter plant will be discontinued and equipment removed to Goshen, where the factory will be enlarged. The Diamond company will be consolidated with the purchasing organization.

The Central Motor Parts Co., 409 North Capital Avenue, Indianapolis, will soon commence the erection of a six-story and basement service and repair building at Monument Circle, estimated to cost $200,000, for which plans have been drawn by Bass, Knowlton & Co., 312 North Meridian Street. Donald Test is in charge.

The Standard Body Co., Angola, Ind., manufacturer of automobile bodies, is perfecting plans for an addition estimated to cost $200,000, including machinery.

The Interstate Cut Stone Co., Bedford, Ind., will erect a one-story plant, 125 x 450 ft., to cost about $500,000 with equipment.

Plans for the construction of a $500,000 water power dam on Flat Rock River at St. Paul, Ind., near Shelbyville, have been completed. Three 35-in. water turbines and three 700-kw. generators will be installed. Bids will be received on the machinery as soon as detailed specifications have been completed, probably within two or three months. John A. Shafer, 1008 Odd Fellows Building, Indianapolis, is engineer and promoter of the project.

Canada

TORONTO, Jan 14.

INTEREST in the machine-tool market the past week was chiefly confined to inquiries. Selling interests state that trade is seasonably quiet, but the outlook for business is bright and a strong demand for practically all lines is expected to develop in the near future. The mining fields of northern Ontario are proving a source of interest to equipment dealers and during the past six weeks some large orders have developed and several others are still in prospect.

The MacKinnon Steel Co., Sherbrooke, Que., has purchased a site in Emard Ward, Montreal, where it proposes to build a steel plant to take care of increased business and the growing demand for its products in the Montreal district. Plans have not been sufficiently advanced to make known the details of construction, but it is understood that a full line of fabricating equipment will be installed.

The City Engineering Department, London, Ont., is preparing plans for a sewage disposal plant to cost $60,000, to be installed in connection with Wellington High Street sewage system now under construction.

B. Vezina, 72 Montee Street, Laurent, Cartierville, Que., will purchase equipment for a forge shop to replace that recently destroyed by fire.

A. Archambault, 3520 Henri Julien Avenue, Montreal, is receiving prices and catalogs on general foundry equipment.

The Canadian No Blow Out Tube Co., Ottawa, Ont., will erect a plant at Edmonton, Ont., and is asking for information and prices on equipment for the manufacture of rubber tires, etc. W. Johnson, Barrister Trust Building, Ottawa, Ont., is interested.

J. Date, 15 Concord Street, Montreal, is receiving prices on machinery and general equipment for a brass foundry.

Terando Coutu, St. Donat, Que., contemplates erection of power development plant and is in the market for a dynamo.

J. A. Joudrey, Wolfville, N. S., will build an electric light and power plant there.

The Marine Welding & Boiler Co., Port Colborne, Ont., has started work on a machine shop to cost $10,000.

The Bernard Avenue Garage Co., Outremont, Montreal, contemplates the construction of a garage on Bernard and De L'Espee Streets to cost $250,000. Perfrault & Godbois, 2100 Park Avenue, Montreal, are architects.

The Red Star Refineries, Canada Cement Building, Montreal, will require equipment for an oil refinery to be built at Montreal East.

The National Veneer & Lumber Co., South River, Ont., is in the market for woodworking machinery and tools.

E. Bessette, 540 Labreque Street, Montreal, Que., will purchase tools and general equipment for a foundry.

Western Canada

J. W. Mackintosh will erect a machine shop on Kingsway Avenue, Vancouver, B. C., and will require equipment.

The British Columbia Electric Railway Co. will build an additional 24,000-hp. unit to its hydroelectric plant at Stave Falls, B. C., estimated to cost $1,500,000.

The N. M. Paterson Grain Co., Fort William, Ont., proposes to build a grain elevator at Vancouver, B. C.

E. J. Palmer, general manager Victoria Lumber & Mfg. Co., is having plans prepared for a mill to be erected at Chemainus, B. C., to replace that recently destroyed by fire.

McNicol & Cowie, Vancouver, B. C., are in the market for the following new or used equipment: Complete concentrating plant for gold, silver and lead ores, about 300-ton capacity, electric power to be generated by oil engines; also three and a half mile aerial tram, about 300-ton capacity, and a 500-ft. compressor.

Gulf States

BIRMINGHAM, Jan. 14.

TENTATIVE plans are being considered by the Birmingham Hollow Tile Co., Ensley, Ala., for rebuilding the portion of its plant at Twenty-fourth Street and Avenue C destroyed by fire Jan. 7, with loss of $80,000 including machinery.

The Ford Motor Co., Highland Park, Detroit, is taking bids for the erection of its proposed assembly plant at Jacksonville, Fla., estimated to cost $400,000 including machinery. Albert Kahn, Marquette Building, Detroit, is architect.

The Arkansas Compress Co., Corpus Christi, Tex., is planning the erection of a new cotton compressing plant at Alice, Tex., estimated to cost $90,000 including machinery. J. K. Cain is secretary and treasurer.

The Continental Cotton Oil Co., Colorado, Tex., has plans for immediately rebuilding the portion of its mill and power house destroyed by fire Jan. 3, with loss estimated at $75,000. Additional machinery will be installed. John Guitar, Abilene, Tex., heads the company.

The Big State Oil Corporation, Dallas, Tex., has secured permission to build a power dam and hydroelectric generating plant on Cedar Creek, near Kaufman, Tex.

R. E. Boggs, Jefferson County Bank Building, Birmingham, machinery dealer, is in the market for one plate bending roll, to handle ¾-in. stock, about 12 to 16 in. between housings.

The H. & H. Machine Works, First Avenue, Decatur, Ala., is perfecting plans for a new shop to cost about $25,000.

The San Antonio Public Service Co., San Antonio, Tex., is arranging an appropriation of about $425,000 for extensions in its electric plant and system during the year and the installation of additional machinery. Additions will also be made in the gas plants and system to cost approximately $175,000.

The Consumers Ice Co., Austin, Tex., plans the installation of electric machinery and other equipment at its plant at Fourth and Red River Streets. Walter Bremond, Jr., is president.

The Atlantic Coast Line Railway Co., Wilmington, N. C., is said to be receiving bids until Jan. 21 for its new car and locomotive shops at Montgomery, Ala., estimated to cost $90,000 with equipment.

The Southern Paper Co., Moss Point, Miss., will make extensions in its local mill and install additional machinery. The plant will be completely electrified, replacing steam-operated machinery. A portion of the existing mill will be remodeled. The work will cost more than $80,000.

C. L. Wood, 816 Sixteenth Avenue, North, St. Petersburg, Fla., will break ground for a one-story ice-manufacturing plant at Fifth Avenue and Tenth Street, 100 x 120 ft., to cost about $35,000. Edward Freland, St. Petersburg, is architect.

The Southern Ice & Utilities Co., Texarkana, Tex., will make extensions and improvements in its electric and ice-manufacturing plants to cost approximately $250,000 including equipment.

The City Council, Melville, La., will receive bids until Jan. 29 for equipment for its proposed municipal waterworks, including two crude oil operated engines, direct connected to electric alternators; motor-driven service pump; 500 gal. per min. motor-driven fire pump; switchboard and auxiliary electric equipment; 50,000-gal. steel water tank and tower; cast iron pipe, etc. Swanson-McGraw, Inc., United Fruit Building, New Orleans, is engineer.

The Gulf Refining Co., Houston, Tex., will commence the construction of a new oil storage and distributing plant on the Indian River Drive, Fort Pierce, Fla., estimated to cost $90,000 with equipment. Headquarters of the company are in the Frick Annex, Pittsburgh.

The Burns Development Co., Spencer-Futch Building, Lakeland, Fla., has inquiries out for about 450 automatic water pumps with average capacity of 450 gal. per hr.

The Woodward Iron Co., Woodward, Ala., is inquiring for a jaw crusher, about 30 x 42 in.

Pacific Coast

SAN FRANCISCO, Jan. 9.

PLANS are being perfected by the Paramount Motors Corporation, 507 California Bank Building, Los Angeles, Fred S. Lack, president, for its proposed plant on 160-acre tract recently secured at Azusa, Cal. A group of buildings will be erected, with main structure, 250 x 300 ft., and power house. It will cost in excess of $200,000 with machinery. Charles S. Norton is secretary and Nelson E. Bliss, treasurer.

The Mountain States Power Co., Albany, Ore., has tentative plans for a hydroelectric power plant at North Bend, near Marshfield, Ore., with initial capacity of 5000 kw., estimated to cost $750,000 including power dam and transmission system.

The San Joaquin Light & Power Corporation, Fresno, Cal., has arranged a fund of $6,000,000 for extensions and improvements in generating plants and system during the year. About $550,000 will be expended for new power substations. A. Emory Wishon is general manager.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has purchased property at Twenty-eighth and M Streets, Sacramento, Cal., 160 x 160 ft., for new machine shops and car barns for the Sacramento street car system, operated by the purchasing company, estimated to cost $100,000 with equipment. E. W. Florence is division manager in charge.

The Wood Mfg. Co., 1617 McGarry Street, Los Angeles, manufacturer of furniture, is having plans drawn for a new one-story factory, 100 x 220 ft., to cost $30,000 exclusive of equipment. All machinery will be electrically-operated. W. C. Pennell, 617 Merritt Building, is architect.

The City Council, Tacoma, Wash, has disposed of a bond issue of $4,000,000, the proceeds to be used for the construction of the first hydroelectrical generating plant on Lake Cushman.

The Detroit Steel Products Co., East Grand Boulevard and Griffin Street, Detroit, is perfecting plans for a new unit at its branch plant at Emeryville, Cal., to cost about $35,000.

The Commercial Fixture Co., 926 South Alameda Street, Los Angeles, manufacturer of store fixtures, show cases, etc., is considering plans for a new factory to cost $70,000 including machinery.

The Stockham Pipe & Fitting Co., Los Angeles, will soon break ground for a new one-story plant, 100 x 145 ft. for the manufacture of pipe, pipe fittings and kindred products, estimated to cost $35,000.

The California Door Co., 43 Main Street, San Francisco has acquired a tract of 40 acres of land at Diamond Springs, El Dorado County, as a site for a new plant. It will include a power house. Plans will be drawn in the near future.

The Bend Water, Light & Power Co., Bend, Ore., has tentative plans for a hydroelectric power plant on the Tumalo River, with initial output of 5000 hp., estimated to cost $400,000. T. H. Foley is general manager.

The Willamette Iron & Steel Co., North Front and Twenty-second Streets, Portland, Ore., has commenced the erection of two additions, 50 x 150 ft. and 50 x 100 ft., respectively, to cost approximately $100,000 with equipment

The Hursh-Sinclair Oil Co., Hillyard, Wash., will proceed with the construction of a new oil refinery near the north city limits estimated to cost $100,000.

Enrique de la Vega, 217 Kerckhoff Building, Los Angeles, Cal., is looking for second-hand cylinders for a Lane & Bodley Corliss engine, 26 or 28-in. diameter, 60-in. stroke.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	46⅝	49¼	Int. Har.	82½	84⅝
Allis-Chal. pf...	92⅞	94⅝	Int. Har. pf....	107	107½
Am. B. S. & Fdy.	79¾	81⅞	Lima Loco.	66½	68½
Am. B.S. & F. pf.	108	108	Midvale Steel ..	28⅞	29⅞
Am. Can	106⅝	110½	Nat.-Acme	9	9½
Am. Can pf.....	109	109¾	Nat. En. & Stm..	40	43¾
Am. Car & Fdy..	164	167¾	Nat. En. & S. pf.	88	88
Am. C. & F. pf..	121	121	N. Y. Air Brake	40¾	41½
Am. Locomotive.	74¼	75½	Otis Steel	9½	11¼
Am. Loco. pf....	117¾	119	Otis Steel pf....	57½	59
Am. Radiator...	100	103	Pressed Steel Car	55	56¾
Am. Steel Fdries.	37½	38⅛	Replogle Steel...	11¾	12⅛
Am. Stl. Fd. pf..	102¼	102½	Republic	51⅛	53¾
Bald. Loco.	124⅞	127⅝	Republic pf.	89	90
Bald. Loco. pf...	111½	112½	Sloss-Sheffield ..	59¼	62
Beth. Steel	53⅝	55⅜	Steel of Canada.	76¼	77⅛
Beth. Stl. 7% pf.	90½	92½	Superior Steel ..	32⅛	34⅞
Beth. Stl. 8% pf.	108	108	Transue-Wms. ..	33½	34
Br. Em. Stl. 2 pf.	15¼	15⅞	Un. Alloy Steel..	33¾	35
Chic. Pneu. Tool	82¾	84	U. S. Pipe.....	75¼	84⅝
Colo. Fuel	25	27½	U. S. Pipe pf....	84	86½
Crucible Steel ..	66⅞	68½	U. S. Steel.....	99½	100¼
Crucible Stl. pf..	89⅞	89⅞	U. S. Steel pf...	119¼	120¼
Deere pf.	70	75	Vanadium Steel.	30¼	31¾
Gen. Electric ...	196¼	200½	Va. I., C. & Coke	52	53
Gt. No. Ore Cert.	28½	30	W'house Air Br.	85	85½
Gulf States Steel	81½	85¼	Y'gstown S. & T.	69¼	70½
Inland	36¼	36¾			

Upon the application of the Western Metal Specialty Co., the Milwaukee Circuit court has appointed Julius J. Goetz receiver of the Titan Truck Co., Milwaukee, manufacturer of motor trucks.

The Zwebell Brothers Co., Schleisingerville, Wis., manufacturer of tire repair and vulcanizing machinery, has been placed in charge of Otto H. Wadewitz as receiver under an order of the Washington County Circuit court, upon the application of the Crucible Steel Casting Co., Milwaukee.

Creditors of the bankrupt Mitchell Motors Co., Inc., Racine, Wis., have been notified of a meeting to be held Jan. 28 to consider and act upon offers for the purchase of the properties, valued at $900,000, in the report of the appraisers. The entire plant has been dismantled and the equipment sold.

Affairs of the Ogren Motor Car Co., Milwaukee, manufacturer of passenger automobiles, have been placed in charge of Julius J. Goetz as receiver under an order of the Milwaukee Circuit court, on application of the Cleveland Hardware Co., Cleveland. The company has been inactive for six months and has disposed of the bulk of its machine shop equipment.

The Davis Sewing Machine Co., Dayton, Ohio, advises regarding a court order recently sought and obtained for the sale of the plant, that the purpose is to take the company from the receivership and to establish a clear title to the assets. This is a step in a plan of organization which is now receiving attention. These proceedings affect in no way the production and distribution of products, which include forgings, grey-iron castings and household equipment.

The Continental Can Co. has declared a dividend of 5 per cent in common stock, in addition to the regular quarterly cash payment of $1 a share. The company finished 1923 with current assets of approximately $10,000,000 against $9,075,973 at the close of 1922. President Cranwell stated that from time to time improvements are financed from current earnings and that "the management plans annually to distribute among stockholders additional stock appropriately representing the earnings so invested."

Directors of the Wheeling Steel Corporation have declared a dividend of 7 per cent on the "A" preferred stock and a dividend of 8¾ per cent on "B" preferred, covering all arrearages on both classes of stock. The dividends are payable Feb. 12 to stockholders of record Jan. 8.

The Haynes Automobile Co., Kokomo, Ind., has been refinanced through a bond issue largely taken by the citizens of Kokomo, and operations will be carried on without interruption. Elwood Haynes will continue as president and Alton Seiberling as vice-president. Hayden Eames will take over the duties of general manager, formerly performed by Mr. Seiberling.

Directors of the Onondaga Steel Co., Syracuse, N. Y., have declared a semi-annual dividend of 3½ per cent on the preferred stock. According to E. D. Newkirk, treasurer, the business has been increasing and promises to continue to do so through 1924.

The Remy Electric Co. of the General Motors division has purchased an additional plant from the Arvac Mfg. Co., Anderson, Ind., which formerly built universal joints and other parts. The Remy company's main plant covers entirely the eight acre site originally owned, hence expansion is prohibitive there. The new acquisition comprises 85,000 sq. ft. of floor space and ten acres of ground, which will permit future additions as needed.

The International Combustion Engineering Corporation, New York, which developed the Lopulco system of burning pulverized coal under boilers, has entered into a working agreement with the Societé Anonyme des etablissents Delaunay Belleville, of St. Denis sur Seine, France, a large boiler manufacturer.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.40c. to 4.70c.	.....
Nos. 22 and 24	4.45c. to 4.85c.	5.10c.
No. 26	4.50c. to 4.90c.	5.15c.
No. 28	4.60c. to 5.00c.	5.25c.
No. 30	4.80c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.70c. to 5.10c.
No. 16	4.85c. to 5.25c.
Nos. 18 and 20	5.00c. to 5.40c.
Nos. 22 and 24	5.15c. to 5.55c.
No. 26	5.30c. to 5.70c.
No. 27	5.45c. to 5.85c.
No. 28	5.60c. to 6.00c.
No. 30	6.05c. to 6.45c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

	Standard Steel Black	Galv.	*Wrought Iron* Black	Galv.
½ in. Butt	—41	—24	— 4	+19
¾ in. Butt	—46	—32	—11	+ 9
1-3 in. Butt	—48	—34	—11	+ 6
2½-6 in. Lap	—44	—30	— 5	+14
7-8 in. Lap	—41	—11	— 9	+ 9
9-12 in. Lap	—34	— 6	— 3	+16

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER — Per Lb.

Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 18¼c.
High brass wire	17¾c. to 18¾c.
Brass rods	15 c. to 16 c.
Brass tube, brazed	25¼c. to 26¾c.
Brass tube, seamless	21½c. to 22½c.
Copper tube, seamless	22½c. to 23½c.

Copper Sheets

Sheet copper, hot rolled, 20½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14 x 20	Prime	Seconds
		80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC $12.55	$10.70	IC	7.00	6.75
IX 13.95	12.55	IX	8.25	8.00
IXX 15.55	13.75	IXX	9.50	9.25
IXXX 17.10	15.30	IXXX	10.75	10.50
IXXXX 18.85	16.80	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	51c.
Bar	58c. to 60c.

Copper

Lake ingot	15½c.
Electrolytic	15 c.
Casting	14 c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10¾c. to 11½c.

Lead and Solder*

American pig lead	9¼c. to 9½c.
Bar lead	11c. to 12½c.
Solder ½ and ½ guaranteed	35¾c.
No. 1 solder	33¾c.
Refined solder	29¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	12½c. to 13c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

Business is still very quiet and values show little change. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.25
Copper, light bottoms	9.00
Brass, heavy	6.00
Brass, light	5.00
Heavy machine composition	8.75
No. 1 yellow brass turnings	6.00
No. 1 red brass or composition turnings	8.00
Lead, heavy	6.50
Lead, tea	5.75
Zinc	4.00
Cast aluminum	16.50
Sheet aluminum	16.50